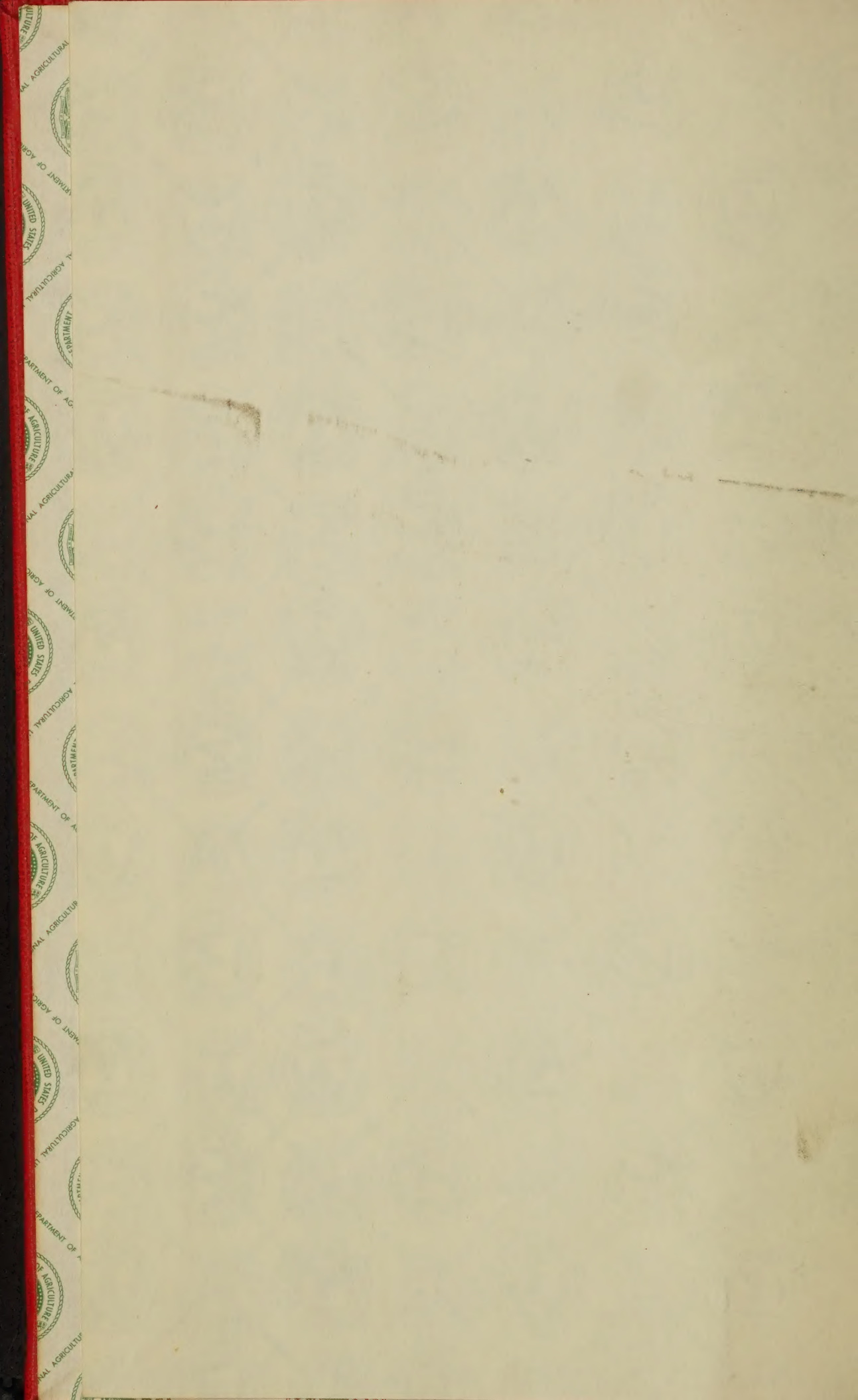


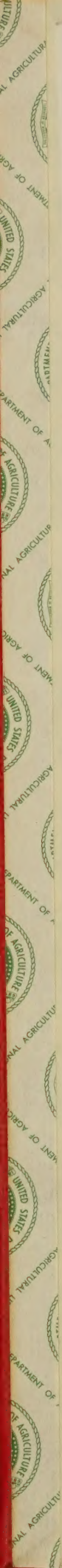
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VOL. XXVI., PART 2.

[FEB., 1911.]

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ISSUED BY DIRECTION OF

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Agriculture.

SPRAYING FOR WEEDS.

Farmers and gardeners frequently seek for information as to getting rid of weeds on the land by using some destructive spray, which will kill the weeds without injuring the grass or growing crops. The eradication of weeds by other than cultural methods has been a subject of study at numbers of agricultural experiment stations in America and Europe, but little seems to be known on the subject in Australia. It has been found by numberless experiments in the United States that there are certain sprays which can be safely used for the extermination of weeds without detriment to a growing crop. It also came under our notice that, when a few years ago the Department of Agriculture and Stock undertook to destroy the prickly pear at Westbrook, the pear was completely killed, whilst the grass grew more vigorously, and wild flowers were abundant over all the poisoned area. In a "Farmers' Bulletin, No. 360," issued in June, 1909, from the Office of Experiment Stations, Washington, we find the following directions for spraying fields on which crops are growing, which should prove of great value to all cultivators who are troubled with weeds, especially wild mustard (charlock), thistles, burrs, dodder in lucerne, &c.:—

Spraying for Weeds.

The eradication of weeds by other than cultural methods has been a subject of study at a number of the agricultural experiment stations and elsewhere. This has resulted in the discovery that various chemicals through their corrosive or other action will destroy many kinds of weeds. As long ago as 1895 it was shown by the Vermont Station that the orange hawkweed, a pest in lawns and pastures, could be controlled by sowing salt over the lawns at the rate of about 3,000 lb. per acre without injury to the grass. Lime, salt, arsenite of soda, gasoline, kerosene, crude carbolic acid, and copper sulphate have all been recommended for destroying weeds in drives, walks, tennis courts, and other places where it is desired to keep down all plant growth. Where cultivated plants are grown, thorough tillage can be relied upon to keep down weeds, but the serious problem of eradicating weeds in grain fields, pastures, and large lawns is the one to which present consideration is given. For this purpose, whatever materials are used, they must not be seriously injurious to the grain crop or the grass, yet they must be sufficiently destructive of weeds to make their use economically practicable.

In parts of the grain-producing States of the north-west, wild mustard, or charlock, and wild radish have become especially troublesome, the wild mustard particularly so. This weed is very common in wheat, oat, flax, and other grain fields from Wisconsin to the Dakotas and adjoining States, and it not only crowds out more valuable plants, but it may become positively injurious through its abundance. Like many others of our most troublesome species, the wild mustard is of European origin, and for many years spraying with corrosive chemicals has been practised in the warfare against the pest in Europe. Copper sulphate (blue vitriol) and iron sulphate (green vitriol or copperas) are the substances most used. Both are efficient in destroying the wild mustard, the principal difference being in their relative cost. The blue vitriol costs more per lb., but does not require as strong a solution as is necessary of iron sulphate or copperas. There is now on the market a granular form of iron sulphate that can be secured for about 10 dollars or 12 dollars (£2 or £2 10s.) per ton, or even less when bought in large quantities. This is applied in the form of a solution, about 100 lb. of copperas being dissolved in

50 gallons of water. At this rate it makes about a 20-per-cent. solution, and 50 gallons is sufficient for spraying 1 acre, if properly applied. For its application a good spraying machine is required, and if a considerable area is to be treated one of the better power sprayers, that deliver the solution with considerable force, should be used. For small areas, hand or knapsack sprayers may be employed.

The direction given by the Wisconsin Station for spraying oat fields with a solution of iron sulphate for the eradication of wild mustard will apply to the treatment of almost any grain or grass field:—

“The spraying should be done on a calm, bright day, after the dew has disappeared, as the work is more effective if the solution is put on in the warm sunlight. When rain follows the spraying within a few hours, the extermination of the mustard will not be complete.

“The grain fields should be sprayed when the mustard plants are in the third leaf, or before the plants are in blossom, in order to have the spray do the most effective work. The day following the spraying the tips of the blades of grain may be somewhat blackened, but no detrimental effects can be noticed, either to the crop or grasses seeded with it, two weeks after spraying.

“Daisies, cocklebur, bindweed, ragweed, chicory, sheep sorrel, yellow dock, wild lettuce, and many other weeds were partially or wholly eradicated from the fields where tests were made for the extermination of mustard.”

In addition to the charlock, or wild mustard, and those mentioned above, other weeds are destroyed by the spray without injury to the crops, among them, according to the reports from the North Dakota Station, being the very troublesome Canada thistle.

The explanation of the action of the chemicals seems to be about as follows:—The chemical, which is corrosive, attacks the young and tender tissues of the rapidly growing weeds, causing their destruction, while there is little if any injury to the grain crop, particularly if it is a winter grain or one that was sown early in the spring, so that the crop has gained considerable growth before the spraying.

Investigations at the North Dakota* Station with chemical means for the control of weed pests have shown that, in addition to weeds in fields, such persistent weeds as dandelions may be eradicated in lawns, parks, and meadows by thorough spraying with iron sulphate solution without any injury to the lawn or pasture grass. In the region about Fargo, where the experiments were conducted, spraying once a month or every six weeks throughout the year was found to keep the dandelion in check. For spraying lawns the application should be made a few days after the grass has been cut, with a solution of about 2 lb. of iron sulphate to 1 gallon of water. The spray should be forcibly applied, not merely sprinkled over the weeds, on a bright sunshiny day, and the lawn should not be mown for two or three days after the spraying. Heavy rains soon after the spraying will destroy the weed-killing power of the solution. Wherever chemicals are used for weed eradication on lawns, it will be found advisable to scatter grass seed over the lawn each spring and fall.

In many regions alfalfa and clover fields are infested with dodder, a parasitic plant, that may be recognised by its yellow, thread-like stems which intertwine the plants. Hiltner says that dodder may be destroyed by spraying infested areas with an 18 to 20 per cent. solution of iron sulphate. The immediate effect of the chemical is to blacken the clover or alfalfa, but after a short time the crop recovers and is as vigorous as ever, while the dodder has been completely destroyed. In South Africa, spraying alfalfa with sodium arsenite at the rate of $\frac{1}{2}$ -lb. to 5 gallons of water when well applied was found to destroy dodder with little injury to the alfalfa.

LAMBS FOR EXPORT.

A recent bulletin of the Illinois Experiment Station by W. C. Coffey defines and illustrates the various classes and grades of sheep recognised on the Chicago and other large markets. The information is intended to aid those engaged in growing and handling sheep to understand and apply the market reports. While it is the privilege of a few to visit the markets often and there learn the requirements and the demands for the different grades in the various classes, the great majority of sheep-owners and many feeders must depend largely on the market reports for such information; and the value of these reports to the man who proposes to buy or sell sheep is determined by the extent to which he can apply them to his particular purchase or sale. We pass by Mr. Coffey's remarks on mutton sheep generally, and consider the subclass of these—lambs—as being the most important, due to the fact that the producer can most profitably market his sheep as lambs, and, also, that lamb is preferred to mutton by the consumer.

Traders on the Chicago market estimate that at least 80 per cent. of the sheep received at that place are lambs:—

“At from 12 to 14 months of age lambs pass into the yearling and ewe classes. But it is the degree of maturity the young animal has attained rather than a set, definite age which determines whether or not it belongs to the lamb class. Native lambs usually reach maturity at an earlier age than western lambs, because they receive a greater abundance of feed; and they are generally free from merino blood.

“The most important factors in determining the grade to which lambs belong are: Form, quality, condition, and weight; and the grades recognised on the market are: Prime, choice, good, medium, common, or culls.

“It is understood that when lambs are graded as prime they are the very best of the class that may be generally expected on the market.

“Before a lamb is graded as prime it is determined by sight and touch that it possesses the form, quality, condition, and weight demanded by the dealer in high-class mutton. The butcher demands the form that shows the most development in the loin, back, and leg of mutton. He demands development in these regions because they are the parts from which the high-priced cuts are secured. The animal should show a great deal of depth and breadth and no tendency to be paunchy, because paunchiness adds to the percentage of waste in slaughtering. The prime lamb should present a general fullness and smoothness of outline, both of which indicate thickness and evenness of flesh. There should be an absence of roughness because the waste in the dressing of the rough, ungainly lamb is large in proportion to the carcass, and, furthermore, the appearance of the carcass of such a lamb fails in attractiveness when placed on exhibition in the market. It is generally conceded that form is enhanced if the body is supported by short legs. However, many prime lambs have only moderately short legs. Very long legs detract from the dressed yield and from the appearance of the carcass when displayed, and on this account lambs that are decidedly upstanding do not grade as prime.

“General quality is indicated by a medium-sized, clean-cut head, ears of fine texture, and fine but strong bone, a light pelt, and full, well-rounded outlines. All these suggest a freedom from that coarseness which adds to the waste in dressing, and the unattractiveness which works against the value of the carcass. Of the items of general quality enumerated, lightness of pelt is the most essential. By pelt is meant the skin and wool combined. To secure a pelt of light weight, the skin should be comparatively thin and free from folds or wrinkles, and the wool should not be very dense or oily.”

"The weight of a pelt may be appreciably influenced by the condition of the wool with reference to foreign material and moisture in it," the presence of large amounts of these greatly reducing the price that will be offered—

"Occasionally the general quality of lambs may be developed to such marked degree that they will sell as prime, even though they be somewhat deficient in form. A notable example is the fat Mexican lamb. From the standpoint of form the Mexicans are not specially attractive, since they are upstanding and have narrow bodies and long necks, but they are unequalled in the fineness of their features and their lightness of pelt. Without their high development of general quality, they would not receive favourable consideration from buyers; but because of it, when fat, they top the market.

"The terms 'quality' and 'condition' are frequently used interchangeably on the market, and chiefly because the quality of flesh is largely dependent upon condition. By condition is meant the degree of fatness of a lamb. The reasons why a lamb should be fat are—(a) Other things being equal, there will not be as high a percentage of offal as in the half fat or the thin lamb; (b) the fat adds to the attractiveness of the carcass, and thus makes it more inviting to the purchaser; (c) the comparatively fat carcass loses less in weight in the process of 'cooling out' in the refrigerator and also in cooking; (d) some fat on the outside of the lean meat and a considerable amount deposited through it adds to its palatability by making it more juicy and of better flavour.

"Desirable quality of flesh is indicated by firmness along the back, at the loins, over the sides, and at the leg of mutton. . . . While the flesh should have that firmness which would impress an inexperienced man as being hard, it should have just enough springiness to yield slightly to the touch. . . . The development of fat essential to the prime lamb is indicated by a thick dock, a full, mellow purse, thickness and smoothness on the back and over the ribs, fullness at the neck and flanks, and a plump, well-filled breast.

"It is impossible to tell with exactness, by merely looking at it, the condition of a lamb in the wool, and hence it is necessary to judge condition by placing the hand on the animal.* Experts reply upon placing the hand but once, for example, by spreading the hand so that the back and ribs will be touched by one stroke, or by grasping the loin, or by getting the thickness and fullness of the dock, but none risk their judgment upon sight alone. A great deal is determined by the stroke that touches the back and ribs, because it not only reveals the condition as evidenced by the degree of smoothness present, but also the amount and quality of the flesh by the thickness and firmness of it. This stroke also aids in determining the kind of pelt a lamb may have with respect to thickness of skin, density of wool, and foreign material in it.

"Weight is a factor that varies somewhat with the different seasons in the year, but in general the lamb of prime quality and condition, and weighing 80 lb., sells at the highest price. When spring lambs first appear on the market, they weigh little more than 60 lb., but, if they have the quality and finish, they easily command top prices."

The requirements of form, quality, and condition in case of prime lambs apply also in case of prime yearlings, prime wethers, and prime ewes—

"To grade as choice, lambs cannot fall below the requirements for prime lambs to any marked degree. They must have the form, quality, and condition that make them desirable as mutton of a high class. They usually fail to sell as prime lambs because they are not quite up to the standard in quality, condition, or weight. While lambs frequently fail to grade higher than choice because of their quality or their weight, a lack of condition is most often the retarding factor. This is the grade that includes by far the greater number of the better offerings upon the Chicago market.

"Upon the market, buyers and salesmen often prefer to speak of a band of lambs as being 'good to choice' rather than using either of the terms separately to describe them. This, doubtless, is partly due to the unevenness in bands of lambs, which suggests two grades rather than one. If there is a pronounced unevenness in an offering, that alone is sufficient to prevent them grading better than good. But the individual lamb must be noticeably deficient in form, quality, condition, or weight, or slightly deficient in each, thus making a lower grade through a combination of deficiencies."

Lambs of the medium grade lack to a large extent the condition and quality necessary in the prime lamb—

"It is in this grade more than any discussed above that faulty form is apparent. Long, loosely-coupled bodies, with little spring of rib and rough outlines, are frequently seen. Because they are coarse, underfinished, and often paunchy, they do not dress a high percentage, and what they do produce is without sufficient fat to meet favour with dealers who handle high-class mutton. Only the coarser, heavier-pelted western lambs are found in this grade, as the smoother, tidier range lambs in underfinished condition are sold to go to the country as feeders. Many native lambs, however, come in this grade, because those appearing on the market in low condition or those on the coarse 'bucky' order are not sought as feeders."

Lambs are in the common or cull grade chiefly because they are very far below that condition of flesh that would make them desirable for mutton—

"Coarse, ill-shaped lambs commonly belong to this grade, but not unless they are noticeably lacking in quality of flesh and amount of fat. Offerings in this grade are very light in weight, the range, with the one exception (coarse, 'bucky' natives), being from 30 to 50 lb."

As practically all native lambs appearing in the market go to slaughter while thinner western lambs are sent to the country as feeders, natives form the bulk of the common or cull lambs—

"Under present methods of sheep husbandry, it is impossible to send all native lambs to market in desirable condition, because growers of natives have not yet learned how to keep them free from infestation by internal parasites, and when they are infested to any great extent they do not take on fat.

"In both the common and medium grades are frequently seen what are known as coarse, 'bucky' native lambs. These are the result of careless shepherding on the part of growers. If lambs are left entire, they rapidly become coarse when their sex instinct develops, and, because of this coarseness and the loss of fat resulting from a great amount of fretful activity, they are undesirable as mutton. . . . Growers of natives would save much to themselves annually if they would make it a practice to castrate their ram lambs a few days after they are born. These coarse, 'bucky' lambs are heavier than the bulk of common lambs, as they sometimes weigh as much as 100 lb.

"The term 'cull' is common parlance in sheep market circles, but it has a double meaning. One applies to the lowest grade under a given class, and it is in this sense that the writer uses the term; the other, to the number a buyer may have the privilege to reject when purchasing a band of lambs or sheep at a given price. Therefore, in defining the lowest grade of lambs, the term 'common' is less confusing than the term 'cull.'"

YEARLINGS.—Yearlings of a certain grade are used as substitutes for lambs in the meat trade—

"The ability of the animal to substitute in this way depends upon its weight, quality, condition, and immaturity. An index greatly depended upon for identifying the carcass of a young sheep, or lamb, is what is known as the 'break joint,' which is found immediately above the pastern joint. The leg easily severs at the 'break joint,' leaving a reddish, porous, indented surface,

over which there is a slight, viscid-like secretion easily noticeable to the touch. The presence of this joint in the live animal is best determined by feeling just above the pastern joint for a bony-like prominence, which is a true indication of it. It disappears when the sheep becomes mature, and a sheep that does not have it cannot class as a yearling. The yearling class is composed exclusively of wethers, because the 'break joint' disappears in ewes at about the time they pass out of the lamb class. Lambs born the year previous to the time they appear on the market pass out of the lamb class about 1st July, and from that time the wethers are called 'yearlings' until they are too far toward maturity to 'break,' as the salesmen and buyers familiarly refer to the 'break joint.'

"Yearlings are commonly designated upon the market as 'lights' and 'heavies.' These terms, as they would indicate, refer to weights. Thus we frequently hear the phrases 'prime lights' and 'prime heavies,' by which is meant the quality and condition of animals coming within certain limits of weight rather than desirability as mutton. And, hence, it is felt that 'lights' and 'heavies' are not strictly logical terms upon which to base gradations in this class.

"Since yearlings are used to take the place of lambs, the nearer they approach the quality, condition, and weight of prime lambs the more satisfactorily will they accomplish the purpose for which they are intended. Any great departure in any of the above characteristics as applied to prime lambs will seriously affect the desirability of yearlings, and if they are low in condition they are practically out of consideration as such."

The grades of yearlings are prime, choice, and good—

"Yearlings, to grade as prime, must be highly developed in form, quality and condition, and of a light, handy weight, which ranges from 70 to 90 lb. The form of the prime yearling embodies symmetry, compactness, roundness and smoothness, with no suggestion of uneven lines or prominent parts. Unless such a form is secured, the carcass will appear too great in size to look like a lamb. In general quality the requirements are fine, clean-cut features and a pelt of light weight. As with prime lambs, so with yearlings a high-dressed percentage is demanded, and this is not possible with the animal having very coarse features and a heavy pelt.

"The most important considerations in placing a yearling in the prime grade are quality of flesh and the amount of fat it carries. Slight concessions may be made to a lack in general quality and form, but none to a lack in fat. Unless fat, the yearling is unsatisfactory; hence buyers discriminate sharply against those not showing a high finish.

"Since it is difficult to secure the most desirable form, quality, condition and weight combined in one animal, choice yearlings outnumber those of the prime grade. Any noticeable departure from what is considered prime in any of the above characteristics is sufficient to place a yearling in the choice grade. During the winter season, when the offerings of sheep are almost wholly grain fattened, the greater number of yearlings are in prime condition; but at all times there are offerings that are not of the most desirable form, quality, and weight. . . . Those of more than 90 lb. weight, although they may be in prime condition, rarely grade better than choice. . . . There cannot be a great difference between the condition of prime and choice yearlings, and in fact, the total difference between them is not great.

"Undesirable quality, weight, or condition, or a combination of deficiencies in any two or all three of the above, will, if readily apparent, place a yearling in the good grade. With a few scattered exceptions this is the lowest grade of yearlings offered as mutton. Yearlings of 110 lb. and upward rarely grade better than good, even though they be prime in every other respect. Ill form, general coarseness, and undue weight of pelt are all serious objections, and those having such defects are nearly always placed in

this grade. A rather frequent combination, placing yearlings in the good grade, is underfinished condition and undesirable quality. If yearlings are assigned to this grade solely because of a want of fat, they are almost on the border line between the mutton and the feeder class, and are not much wanted by either packers or feeder buyers.

THATCHING.

The art of thatching, as described in the following leaflet issued by the British Board of Agriculture and Trade, can be learnt by any intelligent farm labourer, if he is given a few opportunities for practice and a little instruction. Farm hands frequently possess a natural aptitude for work of this kind, and an industrious man will soon become proficient.

It is a great advantage to a farmer to have men in his employment who can undertake ordinary thatching. After harvest the local thatcher is often hard-pressed with work, so that it may be difficult to obtain his services when they are most required. Meanwhile the unthatched ricks are exposed to the weather, and, should a wet season be experienced, the damage may be considerable. All risk of this sort is avoided if the thatching can be done by the regular staff, and farmers should, therefore, encourage their men to make themselves proficient in the process.

How to Learn Thatching.

A thorough knowledge of thatching, like that of any other branch of farm husbandry, cannot be gained without careful observation and frequent practice, but the beginner can commence by thatching straw ricks and thus acquire the skill necessary for the more important work of thatching corn and hay ricks.

Outfit and Materials.

The thatcher's outfit is neither a large nor an expensive one; it consists of a bill-hook, a paring knife, and a pair of sheep shears for trimming the eaves, a large "thatching fork" to hold the drawn straw or "yealms," and a wooden hand-rake with iron teeth.

Other articles necessary for thatching are a ladder sufficiently long to reach the ridge of the stack when laid perfectly level with the roof, a quantity of pegs, binding cord or oakum, a suitable wooden mallet or other implement to drive in the pegs (a flat leather attached to the wrist, and covering the palm when pressing the pegs home, serves the same purpose), and a running noose to convey the yealms of straw to the thatcher.

The principal materials used for thatching purposes are straw, reeds, and heather, according to the purpose for which they are intended. Oat and barley straws are only serviceable where the corn to be covered has not to remain in the rick for any considerable length of time; well-grown stiff wheat straw will answer all general purposes on the farm, but for more lasting purposes rye straw and reeds are to be preferred, heather being mostly used for ornamental thatching—as, for example, model dairies, cricket pavilions, and summer houses.

Preparation of the Straw.

The preparation of the straw is of importance. Straw of a dry, loose character cannot be packed so tightly and securely as damp straw; for this reason the straw should be well doused with water and turned over with a fork until it becomes thoroughly moistened. The heap must then be slightly compressed by beating with the fork or treading. This has the effect of ridding the straw of flag and shack, the presence of which tends to arrest the flow of water.

Yealming.

The straw should next be drawn from the bottom of the heap where the pressure is greatest. The usual method is to grasp as much straw as can be gripped by both hands, the two being held close together. The straw is then drawn out by a quick movement of the arms towards the right, followed by a swing over to the left, finally laying it at the worker's feet, the thickest end being to his right-hand side. The work of yealming is usually undertaken by the thatcher's assistant or server.

When a sufficient quantity of this partially straight straw has been collected, the yealmer works through it, using his fingers to regulate it and to remove any loose portions, at the same time drawing the bundle closer to his feet, until the layer amounts to as much as he can hold in the grip of both hands. A "yealm" thus formed should never be broken, but kept firm and secure until placed on the stack. As the yealms are completed, they are placed crosswise on a short rope or cord, the thick and the thin ends alternating. When of sufficient number and weight for a man to carry, the rope, which should have a running noose, is drawn round the yealms, which are in this way conveyed to the rick.

A common practice in the South of England is to place the drawn straw direct in the "thatching fork," which, when fully charged, is carried to the rick, and the straw so conveyed to the thatcher. Other thatchers draw the straw dry and lay it on a board, after which it is damped, trimmed, and straightened out, being finally separated into yealms which are bound up in straw ropes.

Preparation of Stack.

In commencing to thatch a rick, the thatcher first prepares it by filling up any hollows with loose straw and levelling down humps in the roof in order to secure a firm, even surface. As the rick will probably have settled down, the top may require bolstering up with a "dummy," or tight-tied bundle of straw. When the roof has, in this way, been made firm and even, the straw can be laid on.

Perhaps the most opportune time for commencing the work is when the weather is somewhat damp, for the straw is none the worse for being slightly wetted. Under such conditions, also, the work of carrying in the corn is generally at a standstill, and there is ample leisure to complete the thatching of ricks which have already been erected. Very wet weather, however, is quite unsuitable, as the topmost sheaves would then be covered up while still wet with rain. Windy, gusty weather is also unsuitable for thatching, as the thatch is being constantly disturbed and ruffled up.

How to Commence Thatching.

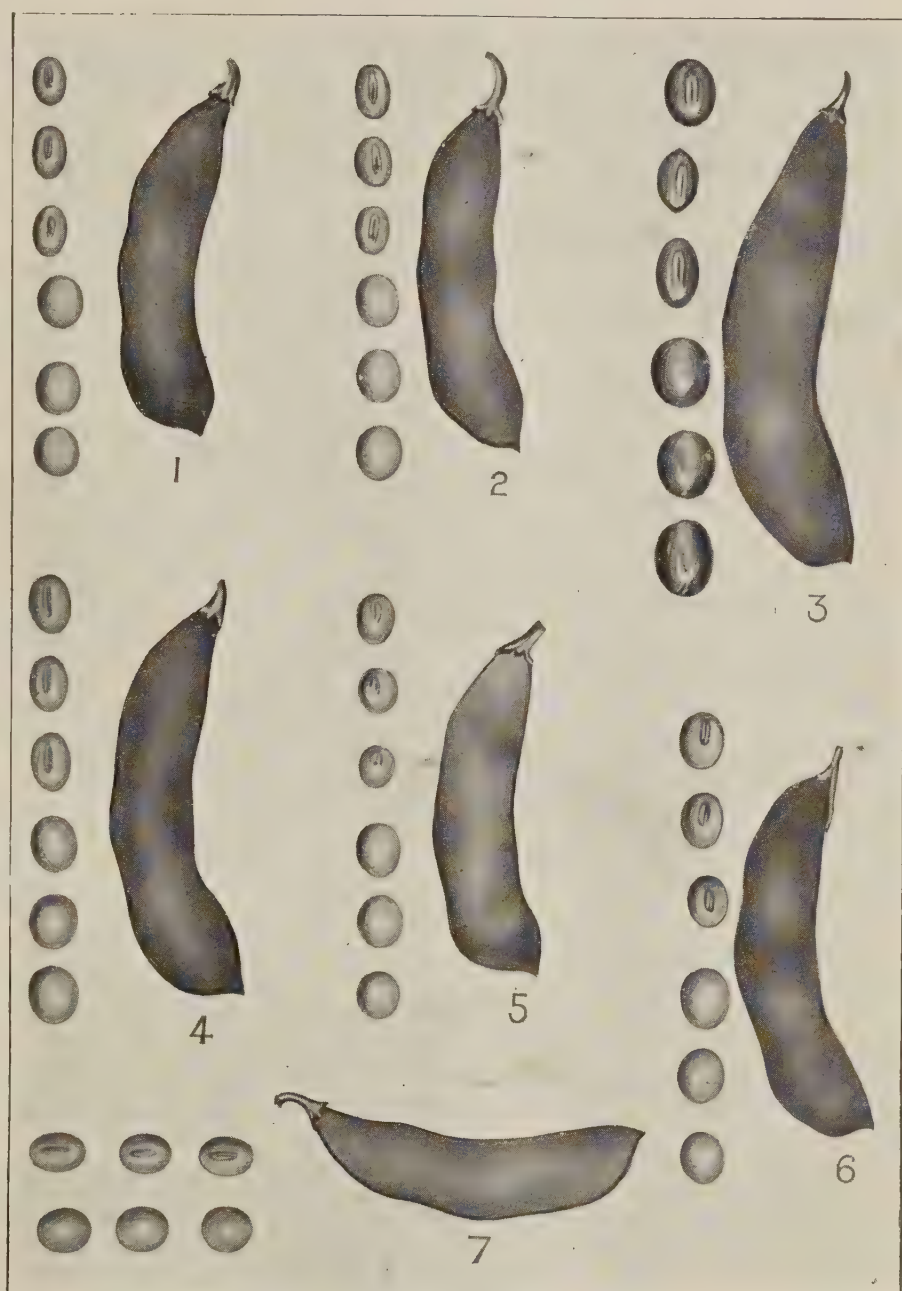
The ladder should be so placed that it lies flat on the rick; the work should then commence at the bottom, or eaves, the straw being meanwhile packed as firmly and securely as possible. When the top is reached, the straw is laid well up to form a point, thus affording a good pitch for the water to run off. In general practice, the eave-line of the stack is laid with a double thickness of straw, in order to provide a projecting eave which will shoot the water off the stack without injuring the sides. The actual operation of laying the yealms of straw upon the stack is quite simple, and very much resembles the slating of a roof. It is important to insert the thin end of each yealm under the roof of the stack; this makes it doubly secure, and ensures an even and permanent thatch. The pegs which are driven in the thatch should be inserted in a horizontal direction, not vertically; in the latter case they easily convey water into the interior of the stack, which naturally has an injurious effect. When laying the yealms alternately, one overlapping the other, the expert thatcher will keep them damp by sprinkling with water, meanwhile combing the straw with a thatcher's rake to make

Plate I.



A FIELD OF SOYA BEANS.

Plate II.



VARIETIES OF SOYA BEANS.

it lie perfectly even; he will then beat it down lightly but firmly so as to consolidate the whole roof into a regular thatch of uniform thickness throughout.

A medium coating of straw well laid invariably throws off water much better than a larger quantity of straw badly placed together. It is customary to commence thatching hipped-end stacks about the centre of one side, in order to ensure a good finish; gable-end stacks are usually commenced at one end. The width of stack capable of being covered without moving the ladder will depend on the thatcher's reach, but this must not be exceeded beyond comfort, for when the thatch has to be packed in at arm's length it can never be done so firmly and securely as when a shorter stretch is taken.

Pegging and Cording.

To keep the thatch in position, pegs made of split hazel, willow, oak, or other tough wood are used. These pegs should be cut into lengths of from 2 to 3 ft., with the ends pointed. Any knots must be shaved off, so that the pegs may be pushed easily into the stack. Split hazel rods are often made to take the place of cord between pegs, an arrangement which certainly has a very ornamental appearance; for general purposes, however, oakum or binding cord is used. As the work of laying the yealms proceeds, the pegs should be inserted in a horizontal direction, and the cord secured thereto. The elaborate roping or cording of ricks is not practised so extensively at the present day as it was some years ago; few farmers keep their grain in the ricks for more than two years, while with the majority under twelve months is usual. If thatching is done with good, well-drawn wheat straw, well packed upon the roof of the rick, there will be no need for the elaborate methods of pegging so frequently seen in some districts. Thatching needs to be done very thoroughly in exposed parts of the country, especially in Scotland and in high-lying farms near the coast.

Trimming the Eaves.

The overhanging eaves of the stack must be pared or trimmed off. This is done by means of the paring-knife, the sheep shears being subsequently used in order to trim off any rough edges and projecting straws, and to impart a smart "finished" appearance to the stack. The greatest importance is attached to the trimming off of the eaves: if this is well done, the under-surface of the eave will present a horizontal or even a slightly rising appearance, and the water will consequently shoot clear of the stack; but if the shears are used incorrectly, and the eave appears sloping downwards, water will find its way into the stack.

Labour.

Working single-handed, a man should complete 5 "squares" in a day of 10 to 10½ hours, though the work may be done much more rapidly. A square represents 100 square feet.

SOYA BEANS.

(Continued.)

Soya Beans in Rotation.

Soya beans are admirably adapted to short rotations, taking either an entire season or part of a season following some small-grain crop. A Soya bean crop is often grown between two wheat crops and oat crops. In such cases, however, an early variety like the medium "yellow" is preferable.

Where a whole season is devoted to Soya beans, two crops of the earlier varieties can be matured in all parts of the cotton belt, and this is in many cases preferable to growing a single crop of a late variety. Where the whole season is thus devoted to Soya beans, they may take any place in a rotation system where corn can be used.

The consensus of opinion among farmers is that a crop of Soya beans benefits the succeeding crop, but not to so great a degree as one of cowpeas.

Regarding the fertiliser requirements of Soya beans, there are but few data available, but no doubt will be forthcoming on this point which is needed. Where fertilisers are used, the general practice is to use acid phosphate at the rate of 200 to 300 lb. per acre, and muriate of potash at the rate of 50 lb. per acre.

Feeding Value of Soya Beans.

The feeding value of any forage crop and for any particular purpose can be determined only by actual feeding experiments. There are, of course, definite relations between the digestible constituents of a feed and the resultant gains in flesh or milk. These relations are, however, more complex than a table of analysis indicates. On this account the relative value of feeds is best shown by comparative feeding trials. Such trials indicate that good Soya-bean hay is about equal to Alfalfa for milk and butter production. Soya-bean meal and cake also prove more valuable than wheat middlings in feeding hogs.

Feeding Value for Sheep.

Experiments have been made to test the value of Soya-bean seed for fattening lambs. In one experiment two lots of ten lambs each were fed the same roughage. One lot received shelled corn and whole Soya beans in equal proportions, while the other received the same quantities of shelled corn and whole oats. The average gain of each lamb during a period of 12 weeks was 16.3 lb. when Soya beans constituted a part of the ration and but 13.7 lb. when oats were used. A pound of gain was produced on 6.11 lb. of grain and 7.11 lb. of roughage in the Soya-bean ration, while 7.28 lb. of grain and 8.62 lb. of roughage were required on the oats ration.

In another experiment the same rations were fed for 12 twelve weeks to two lots of nine lambs each. The lot receiving the Soya-bean ration gained 119 lb. in weight and produced 95.1 lb. of wool against 71 lb. increase in weight, and a production of 81.3 lb. of wool for the lot receiving the oat ration. The second lot also consumed more feed per lb. of gain.

Feeding Value for Dairy Cows.

Soya-bean meal and cake has been found a most excellent feed for dairy cows, compared Soya meal and cake and cotton-seed meal, using the same ration otherwise. The quantity of milk produced from the Soya-bean ration was larger. The butter from the cows fed cotton-seed meal was of a firmer texture, but not nearly as good otherwise as the butter from the cows fed Soya-bean meal and cake. The test indicated that Soya-bean meal was superior to cotton-seed meal for both milk and butter production. Three groups of cows of two lots each were fed to compare (1) Soya-bean straw and corn stover; (2) Soya-bean hay and Alfalfa hay, and (3) Soya-bean meal and cotton-seed meal. There was no chance in these experiments for the individuality of the animals to affect the results, as each lot was fed on the separate rations at different periods in the course of the experiments.

Soya-bean straw was found very palatable and superior to corn stover as a feed. More feed was eaten in the case of the Soya-bean straw, but the cost of the feeds consumed during the 30-day period was practically the same. The Soya-bean ration produced 12 per cent. more milk and 14 per cent. more butter fat, so that the cost of a gallon of milk was 12 cents less and of a pound of butter fat 2.1 cents less than when corn stover was fed as roughage.

In the comparison of Soya-bean hay and Alfalfa hay, these substances were fed in combination with corn silage and corn-and-cob meal. Each lot of cows consisted of four Jerseys, and the test lasted through three periods of 30 days each. At the end of this time the results were in favour of the Soya-bean hay by 245 lb. of milk and 20.5 lb. of butter fat. This result indicates a superiority of Soya-bean hay over Alfalfa hay.

In the trial for the comparison of Soya-bean meal and cotton-seed meal the yield both of milk and of butter fat was about 5 per cent. greater for the Soya-bean meal.

Feeding Value for Hogs.

Experiments were made to compare Soya-bean meal and wheat middlings for pork production in three separate experiments in as many years. Two-thirds of the grain ration was corn meal in each case. In each of the experiments the largest gains were made on the Soya-bean rations. Soya beans proved about 10 per cent. superior to wheat middlings for pork production, figuring the costs of the feeds as the same.

The compared rations consisted of 2 parts of corn meal and 1 part of Soya-bean meal with corn meal and wheat middlings in equal proportions and with 5 parts of corn meal and 1 part of tankage for pork production. The Soya-bean ration produced the largest daily gains, and this with the smallest quantity of feed consumed for each pound of gain. Experiments have several times been made to test the value of Soya-bean meal in combination with corn meal and with Kafir meal in comparison with the two latter feeds alone in feeding hogs. The feeds were mixed in proportion of four-fifths corn of Kafir and one-fifth Soya beans. Larger gains, varying from 13 to 37 per cent., were made in every case on the mixed rations than on corn or Kafir alone.

With corn meal alone 100 lb. of gain cost 3.92 dollars, with corn meal and Soya-bean meal 3.73 dollars, and with Kafir meal and Soya-bean meal 3.37 dollars. For these computations the value of corn meal was fixed at 14 dollars a ton, Kafir meal at 13 dollars a ton, and Soya beans at 25 dollars a ton or 75 cents a bushel.

Storing Soya-bean Seed.

The storage of Soya-bean seed requires special care. The grain should be thoroughly dry when put into storage or else placed where good ventilation is afforded; otherwise it is almost certain to heat and be ruined as far as germination is concerned. No matter what may be the condition of the seed at the time it is stored, it should be examined occasionally to detect any tendency to heat.

Even when Soya-bean seed has been stored carefully, the germination is apt to fall off rapidly. In fact, it is as a rule, unwise to plant seed more than one season old without first testing it for germination. Unlike cowpea seed, that of Soya beans is rarely attacked by weevils.

Comparison of Soya-bean Grain and Cotton-seed Meal.

Throughout much of the region well adapted to Soya beans dairy farmers purchase cotton-seed meal for a high-protein feed. Numerous experiments have shown that Soya-bean meal is equal or superior as a feed to cotton-seed meal both for cows and hogs.

Yields of 20 bushels per acre of Soya beans on lands of moderate fertility may confidently be expected in the region where the best medium or late varieties will mature. On comparatively poor soils yields of the best varieties have been obtained in acre plots as follows:—29.7 bushels, 23.6 bushels, 23.3 bushels, 23.1 bushels, 22.6 bushels, 21.6 bushels, and 21 bushels. Similar and in many cases larger yields are reported by many farmers. Yields of 40 to 50 bushels per acre have been frequently reported, and some writers have mentioned yields of 100 bushels per acre. It is doubtful whether yields of even 50 bushels per acre are made, except on small areas. The above seed yields are comparable in value to those of wheat or corn, and the crop may come to be grown extensively as a money crop, especially in regions where the boll weevil makes cotton culture uncertain. For the present, however, the culture of Soya beans is recommended mainly to those farmers who can feed the crop.

During the past ten years Soya-bean meal has been imported into Europe in large quantities from Manchuria, and has met a ready sale at a price

above that of cotton-seed meal. This would seem to assure a market for practically unlimited quantities.

The relative richness of the Soya bean in oil and other constituents, as compared with other oily seeds, is shown in the following tables:—

Table 1.
ANALYSES OF SEEDS OF SEVERAL VARIETIES OF SOYA BEANS.

VARIETY.	FRESH OR AIR-DRY SUBSTANCE.					
	Water.	Protein.	Fat.	Nitrogen Free Extract.	Fibre.	Ash.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Greenish Yellow	8·67	36·59	20·55	24·41	4·00	5·78
Medium Yellow	7·42	34·66	19·19	27·61	5·15	5·97
„ Brown	7·45	36·24	18·96	26·28	4·79	6·28
Large Yellow	7·49	32·99	21·03	29·36	4·12	5·01
„ Green	7·43	33·96	22·72	25·47	4·57	5·85
„ Black	8·00	35·54	19·78	26·30	4·53	5·85
„ White	7·43	37·82	20·23	23·65	5·05	5·82
Average	7·70	35·40	20·35	26·15	4·60	5·79

Table 2.
ANALYSES OF COTTON SEED, SUNFLOWER SEED, AND PEANUTS.

KIND OF SEED.	FRESH OR AIR-DRIED SUBSTANCE.					
	Water.	Protein.	Fat.	Nitrogen Free Extract.	Fibre.	Ash.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Cotton Seed (whole)—						
Minimum	8·00	13·62	10·40	7·58	17·60	2·89
Maximum	17·51	29·70	29·34	36·70	32·40	8·00
Average of 25 Analyses ...	9·92	19·38	19·45	22·57	22·57	4·74
Sunflower seed (whole)—						
Minimum	8·50	15·80	20·90	22·00	29·50	2·10
Maximum	8·80	16·70	21·50	20·70	30·30	3·20
Average of 8 Analyses ...	8·60	16·30	21·20	21·40	29·90	2·60
Peanuts (Kernels)—						
Minimum	4·90	23·20	35·00	12·70	2·00	1·90
Maximum	13·20	31·50	47·40	19·10	18·40	3·80
Average of 7 Analyses ..	7·50	27·90	39·60	15·60	7·00	2·40

Analysis of Soya Beans made for Mr. Liardet.

2nd July, 1909.

Imperial Institute of the United Kingdom and the Colonies.

No. 1.—Sample of “green Soya beans” (North China), 1 oz.; yield of oil, 17·1 per cent. (3 years old).

No. 2.—Sample of “yellow Soya beans” (North China), 3 oz.; yield of oil, 17 per cent. (3 years old).

The percentages of oil recorded for Soya beans vary from 15·8 to 18·9, and 18 per cent. appears to be a fairly common figure.

(Signed) WYNDHAM P. DUNSTAN,

The Director, Imperial Institute,

London S.W.

"Homco Laboratory,"

The Hull Oil Manufacturing Co., Ltd.,

Hull, 15th September, 1909.

Analysis.

Black Soya Beans—

(North China) Oil, 16·80 per cent. (3 years old).

„ Albuminoids, 47·80 per cent.

„ Nitrogen, 7·66 per cent.

White Soya Beans—

(North China) Oil, 16·60 per cent. (3 years old).

„ Albuminoids, 21·87 per cent.

„ Nitrogen, 3·50 per cent.

(Signed) H. WAITES,

Chemist.

SOJA BEAN OIL.

This oil is obtained from the seeds of *Soja hispida*, a plant indigenous in China, Manchuria and Japan, where the oil is used for edible purposes. The seeds contain 18 per cent. of oil. The manufacture of Soja-bean oil forms one of the staple industries of Manchuria (Sir Alexander Hosie, Manchuria. Publishers—Methuen and Co., London, 1901). The plant is also extensively cultivated in Japan. The beans contain besides the oil about 30-40 per cent. of casein. A sample of the oil extracted with ether by Morawski and Stingl gave 0·22 per cent. of unsaponifiable matter, and 2·28 per cent. of free acid calculated to oleic acid. The proportion of solid fatty acids in the oil is approximately 11·5 per cent. of the total mixed fatty acids; Lane found 80·26 per cent. of liquid fatty acids. The bulk of the solid fatty acids is stated to consist of palmitic acid; the liquid fatty acids consist of oleic and linolic acids. On exposure to air, it dries slowly with formation of a thin skin.

Comparison of Soya Beans and Cowpeas.

Inasmuch as the Soya bean is adapted to nearly the same place in the farm rotation as the cowpea, a comparison of the two plants is pertinent.

The Soya bean is determinate in growth—that is, it reaches a definite size and matures. Nearly all varieties of cowpeas, on the other hand, are indeterminate, continuing growth until killed by frost.

Soya beans, with the exception of a few varieties, do not vine, but grow erect or nearly erect. Cowpeas, on the other hand, are viny plants, and therefore more difficult to harvest.

Soya beans mature all their pods at one time. Cowpeas continue to produce green pods as long as the plant lives.

Soya beans will withstand quite heavy frosts, both in the spring, when young, and in the fall, when nearly mature, while the same frosts are fatal to cowpeas.

Soya beans are more drought-resistant than cowpeas, and in a dry season will give much greater yields; they will also withstand excessive moisture much better.

For green manuring or soil improving, the cowpea is far more valuable than the Soya bean, as it will smother weeds much more successfully.

The value of the hay of the two plants is nearly the same. There is frequently doubt as to which is the more desirable to grow. On relatively poor soil or when broadcasted, cowpeas are always preferable. When cultivated, the Soya bean will yield the greater return, and if cut late the hay is more easily cured. For growing with corn or sorghum for hay or silage, the cowpea is generally preferable to the Soya bean.

The feeding value of an acre of Soya beans for beef cattle was found to be about 50 per cent. greater than that of cowpeas grown on an adjoining acre. This was also approximately the difference in yield of the two crops.

As a grain-producer the Soya bean is in every way preferable to the cowpea, as it produces larger yields of richer grain and can be harvested much more easily.

The Soya bean, therefore, is to be recommended above the cowpea where intensive, rather than extensive, farming is practicable and desirable.

SUMMARY.

(1.) For extensive farming the Soya bean is the best annual legume to grow for forage in the cotton belt and the corn belt.

(2.) The Soya bean, whether used as hay, grain, straw, or ensilage, is very valuable as feed for live stock.

(2.) Soya-bean hay is practically identical in feeding value with alfalfa, and yields from 2 to 3 tons per acre. To make good Soya-bean hay the crop must be cut when about half the pods are full grown, or when the top leaves first begin to turn yellow.

(4.) Soya-bean grain is more valuable than cotton-seed meal as a supplemental feed in the production of pork, mutton, wool, beef, milk, and butter. A bushel of Soya beans is at least twice as valuable for feed as a bushel of corn. As the grain is hard, it is usually desirable to grind it into meal for feeding. This is best done by mixing with corn before the grinding to prevent gumming up the mill.

(5.) Harvesting ordinarily should be done when the leaves first begin to turn yellow, as the quality of the straw rapidly deteriorates thereafter and the yield of seed will be practically as large as at any later time. From 20 to 30 bushels of grain and $1\frac{1}{2}$ to 2 tons of straw per acre are not uncommon.

(6.) If Soya beans are grown for the seed alone, and sometimes this is desirable, the harvesting can be done most easily by waiting until all the leaves have fallen.

(7.) Soya-bean straw, if the crop is cut before the leaves fall, is fully as valuable for feeding as timothy hay for cattle, and is eaten by stock with much relish. Even when harvesting is delayed until all the leaves have fallen, stock will eat the straw readily.

(8.) Mixed with corn, Soya beans are excellent for ensilage. The two crops may be grown together, but it is usually better practice to plant in separate fields and mix when putting into the silo.

(9.) It is necessary to give the soil thorough preparation in order to be successful with Soya beans. Only fresh seed or seed which has been tested for germination should be planted. Two-year-old seed is usually not reliable. The seed should be planted shallow, not to exceed 2 in. in depth, and preferably in rows 30 or, better, 36 in. apart to permit sufficient cultivation to keep down weeds.

(10.) For harvesting Soya beans, a mower with or without a side-delivery attachment, a self-rake reaper, or a self-binder can be used. A binder can be used only with the tall varieties. The thrashing can be done with a grain separator by using blank concaves and running the cylinder much slower than for small grains, or by the use of machines specially designed for handling Soya beans and cowpeas.

(11.) Soya beans and cowpeas can be grown together satisfactorily; the hay of such a mixture is better than either crop alone, and the yield is generally greater. In planting the two together, the seed should not be covered too deeply, as deep planting will result in a poor stand of Soya beans.

(12.) As a crop in a short rotation, Soya beans are very desirable. They can be grown so as to use an entire season in the case of the late

varieties, or two crops in one season can be secured from some of the earlier ones. They can also be used very advantageously to follow a small-grain crop the same season.

(13.) The important commercial varieties of Soya beans are the large "yellow," "greenish yellow," "medium yellow," "black," "kidney-shaped green," "large brown," and the "white," which have all a commercial value.

COMBATING DODDER.

It is of the utmost importance that farmers should familiarise themselves with the dodder; otherwise the matter may be talked and written about endlessly, and no headway will be made in exterminating the plant from the fields, or in guarding against the use of seed containing dodder. Strictly avoid dodder-infested seed. Farmers and dealers should become accustomed to the use of a magnifying glass, so as to detect seed impurities and make tests for themselves. Thus, if a farmer buys on sample, as he should, examines his sample himself, and finds it suitable seed, he can without delay purchase his supply from the same bulk lot from which the good sample came. Insist on samples being made up of seed from different parts of sacks or bin; otherwise samples will not be representative of the bulk lots. Though every precaution may have been taken to obtain dodder-free seed, yet a few seeds may have escaped notice and may therefore be present. Thus the clover or alfalfa field will be spotted with dodder. Root up everything on the spots and burn without moving, or remove and burn if there is no danger of scattering seed. Get far enough out from the borders of the spots to make sure that all the dodder is destroyed. Small pieces of plants left continue to grow. Should a field have become generally infested, it is advisable to plough up the lucerne field before dodder seed is formed. Let the succeeding crop be a cultivated, non-leguminous one. Work out of the ground any dodder seed that may be there by encouraging them to sprout, and killing the seedlings by cultivation. Should seed have matured before the crop can be ploughed under, burn the crop over, then plough and follow with a cultivated crop. Any use desired may be made of the stand of lucerne on the ground, providing it is cut for hay, pastured, or ploughed under before the seed is formed.—"Town and Country."

POISONING RATS.

The following recipe for the destruction of rats has been highly recommended in England as the best-known means of getting rid of these most obnoxious and destructive vermin:—Melt hog's lard in a bottle plunged in water, heated to about 150 degrees Fahr., introduce into it $\frac{1}{2}$ oz. of phosphorus for every 1 lb. of lard; then add 1 pint of proof spirit or whisky; cork the bottle firmly after its contents have been heated to 150 degrees, taking it at the same time out of the water, and agitate smartly till the phosphorus becomes uniformly diffused, forming a milky-looking liquid. This liquid, being cooled, will afford a white compound of phosphorus and lard, from which the spirit spontaneously separates, and may be poured off to be used again; for none of it enters into combination, but merely serves to comminute the phosphorus, and diffuse it in very fine particles through the lard. This compound, on being warmed very gently, may be poured out into a mixture of wheat flour and sugar incorporated therewith, the flavour may be varied with oil of aniseed, &c. This dough, being made into pellets, is to be laid into rat holes. By its luminousness in the dark, it attracts their notice, and, being agreeable to their palates and noses, it is readily eaten and proves certainly fatal.—"Journal of Jamaica Agricultural Society."

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

RECORD OF COWS FOR MONTH OF NOVEMBER, 1910.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Average Test Per cent.	Commercial Butter.	Remarks.
			Lb.		Lb.	
College Lass	Ayrshire ...	22 Aug., 1910	1,019	4.4	50.34	
Mona ...	Grade Holstein ...	14 Aug. "	1,073	4.0	47.95	
Hettie ...	Grade Shorthorn	15 Oct. "	992	4.3	47.84	
Auntie ...	Ayrshire ...	8 Aug. "	883	4.5	44.66	
Glen ...	Grade Shorthorn	21 July "	836	4.6	43.26	
Lavina's						
Pride ...	Ayrshire ...	13 Oct. "	952	4.1	43.57	
Lass ...	" ...	5 Nov. "	962	4.0	42.99	
Honeycomb	Shorthorn ...	25 June "	814	4.4	40.45	
Nancy ...	Grade Shorthorn	10 Aug. "	892	4.0	39.86	
Cuckoo ...	Jersey ...	8 July "	661	4.8	35.76	
Remit ...	Holstein ...	8 July "	778	4.0	34.76	
No. 112 ...	Grade Guernsey ...	24 Oct. "	778	3.9	33.85	
Lady Sue ...	Grade Holstein ..	4 April "	767	3.8	32.47	
Helen ...	Grade Guernsey ...	20 Oct. "	918	3.2	32.39	
Miss Ere ...	Dexter Kerry ...	12 Oct. "	642	4.3	30.95	
Daisy ...	Holstein ...	29 Dec., 1909	721	3.9	31.38	
Reamie ...	Ayrshire ...	7 Nov., 1910	686	4.0	30.65	
Butter ...	Shorthorn ...	14 Aug. "	763	3.6	30.52	
Norma ...	" ...	15 July "	613	4.4	30.27	
Tiny ...	Jersey ...	30 July "	515	5.1	29.67	
Peewee ...	Grade Holstein ...	22 Aug. "	813	3.3	29.63	
Lalla ...	" ...	12 Oct. "	748	3.5	29.03	
Lydia ...	Ayrshire ...	8 Sept. "	648	4.0	28.95	
Lemonade ...	Grade Guernsey ...	25 May "	541	4.7	28.63	
Ethel ...	Grade Holstein ...	8 Oct., 1909	638	4.0	28.51	
Cocoa ...	Jersey ...	29 April, 1910	570	4.4	28.15	

Natural pasture only.

PRE-DETERMINATION OF SEX.

The "New Zealand Farmer" says that, in an article in the "New Zealand Times" on the milking herd at the Government State Farm, at Weraroa, mention was made of a famous milk-giving cow, Mary, of that herd. Mary, it was explained, had greatly disappointed everyone concerned by consistently giving birth to bull calves, but this season she gladdened the heart of the manager by producing a heifer calf.

It appears that Mary had thrown seven or eight bull calves in succession. This peculiarity had come under the notice of Mr. A. Tregear, a Wellington resident, who for many years has been observing the working of a natural law, which he claims to have fathomed. This law governs the determination of sex. The Minister of Agriculture granted Mr. Tregear permission to apply his system to eight cows and other stock at the Government farm. This number included Mary. Although the other cows have not yet calved, the obstinate Mary has given birth to a heifer calf, and thus fulfilled Mr. Tregear's prognostication. The full results of the experiments at Weraroa with Mr. Tregear's system are being watched with much interest.

WATER FOR THE DAIRY.

The importance of a good supply of reliable water cannot be over-estimated for dairying purposes. Without such a supply it is impossible to make good keeping butter, or to keep the animals from which the milk is obtained in a healthy condition. Many impurities in butter have been traced to bacterially contaminated water used for washing away the butter-milk, or to milk supplied by cows which have been drinking water from stagnant pools, or from pools which receive the drainage from the farmyard. Enough cannot be said against permitting the use of impure water in the dairy, on the score of health, to say nothing of the injury occurring to milk products which come in contact with water from a contaminated source. When the quality of the butter is not as good as is expected, and when no fault can be alleged against the cream ripening, or the food the cattle get, it is advisable to analyse a sample of the water used, as the trouble probably arises there.

Statistics.

COMMONWEALTH METEOROLOGY.

RAINFALL OF QUEENSLAND.

TABLE SHOWING THE TOTAL RAINFALL FOR EACH MONTH OF THE YEAR IN THE AGRICULTURAL DISTRICTS OF QUEENSLAND.

STATIONS.	1909.		1910.										
	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
<i>North.</i>													
Bowen	3.15	19.98	15.45	7.10	21.45	5.26	0.18	2.23	0.58	0.18	3.75	0.30	3.89
Cairns	7.31	15.24	21.80	17.12	24.16	16.13	3.51	6.59	Nil	3.59	1.34	1.67	7.27
Geraldton	14.57	19.98	20.35	34.57	33.74	24.57	11.90	19.35	1.34	7.42	11.51	3.18	7.30
Gindie State Farm	...	...	...	...	...	...	...	2.65	1.45	Nil	...	...	...
Herberton	4.50	5.11	16.64	12.21	12.40	3.50	1.85	1.70	Nil	0.88	0.58	0.43	4.93
Hughenden	0.54	8.01	4.52	3.59	2.95	0.30	0.41	0.85	0.48	Nil	2.75	1.57	3.41
Kamerunga State Nurs.	...	...	...	...	...	...	...	Nil	...	3.39	...	2.06	...
Mackay	3.18	25.56	35.28	9.73	24.31	6.18	3.73	5.70	1.1	0.48	4.32	0.7	2.67
Mossman	...	...	...	...	...	...	...	...	...	1.91	2.90	3.17	10.36
Rockhampton	4.55	2.74	11.93	1.28	19.84	0.61	0.59	5.98	1.67	0.23	1.62	0.99	4.17
Townsville	1.31	11.51	23.07	10.88	17.21	2.29	0.26	1.05	0.33	0.3	3.34	0.11	2.53
<i>South.</i>													
Biggenden State Farm	2.83	6.96	7.22	3.99	3.82	0.73	1.06	5.25	0.92	0.28	...	2.36	4.59
Brisbane	4.14	6.45	7.24	4.19	6.42	1.22	0.43	6.74	0.39	...	2.72	3.27	2.49
Bundaberg	3.55	2.99	11.81	2.43	8.92	0.31	0.19	6.17	2.10	0.16	2.33	0.70	8.39
Dalby	2.13	2.45	10.88	1.33	3.87	Nil	Nil	6.06	1.42	0.64	2.11	3.96	4.09
Esk	2.69	9.20	8.60	1.94	6.09	1.19	0.27	4.74	0.58	0.23	4.65	3.41	3.84
Gatton Agric. College	...	3.92	11.79	...	3.66	0.69	0.61	5.05	1.99	0.60	...	3.60	2.85
Gympie	3.82	16.54	5.92	3.48	7.74	1.13	0.22	5.57	0.83	0.32	1.54	2.90	3.16
Ipswich	1.56	4.72	6.91	2.78	3.56	1.65	0.20	3.74	1.67	0.58	1.55	3.70	1.96
Maryborough	3.94	6.83	5.65	2.99	3.92	1.72	0.64	4.89	1.09	0.35	1.22	1.53	4.19
Roma	2.12	1.05	4.74	1.47	8.36	0.15	0.4	5.71	1.24	Nil	0.46	3.64	4.39
Roma State Farm	...	...	...	...	...	...	...	...	...	...	0.38	2.95	3.50
Tewantin	1.90	8.85	5.96	3.42	15.18	6.30	1.31	15.08	0.76	1.34	1.52	3.17	7.71
Warren State Farm	...	...	...	...	...	...	...	1.88	...	...	...	0.45	...
Warwick	2.77	4.25	3.93	3.14	2.57	0.68	0.55	3.16	1.82	0.54	1.39	2.20	3.86
„ Hermitage	...	...	...	...	...	...	...	...	1.73	0.39	...	...	...
Westbrook State Farm	...	...	...	...	...	...	...	2.77	...	...	...	2.98	...
Yandina	0.76	20.18	6.71	2.07	11.81	3.26	0.40	13.13	0.70	0.15	0.88	3.34	5.16

NOTE.—The rainfall data in this table are compiled from telegraphic reports, and must be considered as approximate only.

GEORGE G. BOND,
Divisional Officer.

The Horse.

INFLUENZA IN HORSES.

By A. H. CORY, M.R.C.V.S., Government Veterinary Surgeon.

Influenza now appears in this State annually, and, as it is important for horse-owners to recognise the disease as soon as it affects the animal, a few general remarks on the subject are thought advisable.

It is sometimes called "Pink Eye," "Typhoid Fever," "Catarrhal Fever," and various other names. Influenza is a contagious and infectious fever caused by a specific organism; as in the human being, it affects various organs of the body; consequently, different symptoms are exhibited by the animal. Unless the disease is noticed early, and the animal rested and treated, serious complications are likely to follow.

The disease was probably known in the 4th and 5th centuries, and has been reported upon from time to time by various European writers. It appeared as an epizootic in different parts of England in the years 1732, 1760, 1766, 1803, since when it has continued to affect horses.

Prevention consists in isolating all sick and suspected animals, the disease usually being passed on from horse to horse by means of the air, excreta, attendants, harness, &c. Horses should not be allowed to drink from public watering-troughs when influenza is prevalent in the town or district. Disinfect thoroughly all stables in which infected horses have been—mangers, buckets, &c. One attack of the disease usually renders the animal immune for life, but a second attack occasionally occurs.

Symptoms.—The animal suddenly appears dull and dejected, the head hangs down, and the horse has every appearance of general muscular debility and stupor. Sometimes the disease is ushered in with rigors or shivering which last some 15 or 20 minutes. The hair appears rough and staring. The mucous membrane of the eyes is of a pinky or orange colour (pink eye); the mouth and other natural openings, of a yellowish red colour. The eyelids appear swollen and puffy, with a large flow of tears, the animal avoiding direct sunlight as much as possible. There is a discharge from the nostrils, with more or less tenderness of the glands of the throat, accompanied with a cough and hurried respirations.

The internal temperature is at its height usually within 48 hours after the disease is manifested. If a clinical thermometer is used, it will be found to register a temperature of 104 degrees Fahr. to 106 degrees Fahr. (normal 100 degrees Fahr.); it registers thus for 3 or 4 days. The pulse is increased in number—viz., from 50 to 70 beats per minute (normal, 36 to 40), and in fatal cases 90 to 100 beats per minute. The mouth is dry, hot, and frequently covered with mucous; the throat is sore, and there is difficulty in swallowing. Appetite in some cases is absolutely lost, whilst in others the animal continues to feed in a half-hearted fashion. Usually there is a great desire for water. With the temperature being high there is a tendency to constipation, the fæces being hard and more or less coated with mucous; this is sometimes followed by a troublesome diarrhoea. As the disease progresses, swellings appear under the abdomen and chest, the sheath and legs also being swollen. These swellings are not painful, and disappear as soon as the heart and general system of the animal become stronger. The disease usually runs its course in 6 or 10 days, but if the animal has been worked and not treated early it may last 2 or 3 weeks or longer, with serious complications following.

Treatment of the ordinary case of influenza consists in isolating the animal, good nursing, and thorough hygiene. The stable should be clean and well ventilated; the body temperature kept even by means of rugs, bandages, &c., if symptoms warrant it. Provided the weather is warm and dry, the animal is better in a paddock if he is isolated from healthy horses. Small quantities of green food, hot bran mash, a bucketful of hay over which boiling water has been poured, should be offered frequently to the animal. Cleanse the nostrils and eyes from time to time with tepid water and Condy's fluid; drenching with various drugs is not warranted. I have found that it only excites the animal, and when the throat is sore, as is usually the case, there is a tendency for the drench to go the wrong way—viz., into the wind-pipe (trachea) instead of the gullet (or œsophagus). With the ordinary case, I would recommend that one of the following fever powders be given 3 times daily in the drinking water or in a small bran mash—viz., 2 drachms chlorate of potash and 2 drachms of nitrate of potash. This reduces the temperature of the animal, is an antiseptic, and also acts gently on the kidneys and bowels.

Where the throat appears sore, and there is a cough, it is advisable to rub (externally) some turpentine liniment around the throat once or twice daily, or apply some mustard and water used in the same consistency as for table use. Some electuary made up as follows is also beneficial:—

Belladonna	...	...	...	...	...	2 oz.
Chlorate of potash	...	...	...	...	...	2 „
Nitrate of potash	...	...	...	...	...	3 „
Camphor	...	...	...	...	...	3 „
Powdered liquorice	...	...	...	...	...	6 „

Treacle sufficient to bind the above together.

A piece about the size of a hazel nut should be inserted at the back of the mouth by means of a small flat piece of pine wood, about 9 in. long and half an inch broad, generally on the outside of the last molar tooth or grinder, and next to the cheek. If the animal is very dejected, no appetite, and respirations hurried, one of the following balls should be given every 6 or 8 hours:—

Carbonate of ammonia	...	...	...	2 drachms
Powdered nux vomica	...	...	...	$\frac{1}{2}$ drachm
Sulphate of quinine	...	...	...	20 grains
Linseed meal	...	...	...	2 drachms

Sufficient treacle to make ball.

After the animal has apparently recovered, and the temperature dropped to normal, it is essential to give the animal 2 or 3 weeks' rest to allow the nervous system and heart to regain their proper functions.

As pointed out previously, this disease assumes different forms according to the organs of the body chiefly affected; consequently various complications sometimes arises, the commonest of which are inflammation of the lungs (pneumonia), inflammation of the stomach and bowels (gastro-enteritis), inflammation of the brain (meningitis), and fever in the feet (laminitis). When complications take place, the case must be looked upon as being very serious, and, if procurable, the services of a qualified veterinary surgeon should be obtained (if he has not already been in attendance). In the event of these services not being available, the following advice may be of some service:—

INFLAMMATION OF LUNGS.—A frequent cough, at first short and somewhat hard and dry; later on it becomes full and moist; there is a discharge from the nostrils. Increased temperature, hurried respirations, heaving of flanks,

dilated nostrils, little or no appetite, pulse beats increased in number. (Auscultation and percussion of the chest walls will give positive evidence of the extent of the disease, but a great deal of practice is required before one is at all efficient.)

Treatment.—Good ventilation, plenty of fresh air; avoid draughts; if possible, an equable temperature. Keep body warm with rugs and bandages; and friction with hand, wisp of hay or straw if necessary. Give a ball every 6 hours containing—

Carbonate of ammonia	...	...	...	2 drachms
Chlorate of potash	...	...	...	2 „
Camphor	...	...	...	1 „
Belladonna extract	...	...	...	$\frac{1}{2}$ „

also one of the fever powders, mentioned above, twice or thrice daily in the drinking water. The chest walls should be well rubbed with turpentine liniment or mustard and water.

INFLAMMATION OF STOMACH AND BOWELS (Gastro-enteritis).—This condition is brought about by irritant drugs, constipation, unsuitable indigestible food, &c.—things which would probably not affect the animal if it were in ordinary health, but, owing to the febrile condition caused by influenza, they frequently act as irritants to the stomach and bowels. It must be remembered that horses suffering from any febrile disease should be underfed, rather than overfed (provided they are inclined to eat); small quantities of good sound food can be offered frequently, but removed from the animal when it is seen that it does not want it, otherwise it nauseates.

The first symptoms of this complaint are those of ordinary colic—*i.e.*, pawing the ground, general uneasiness, turning its head from side to side towards flanks, tenderness of belly, frequently lying down and getting up. At first the bowels are constipated, the fæces being small and hard and covered with a mucous material; after some 36 or 40 hours this condition is frequently followed by diarrhœa. The pulse beats are increased in number; at first the volume of blood is maintained, but it gets less as the disease progresses, the heart getting weaker. Inflammation of the bowels in horses usually terminates fatally, and it is often noticed that, for several hours before death, the animal appears brighter and free from pain. At the last, however, it becomes more or less dazed, unconscious, wanders round the box or yard, leans against the walls or rails, the flanks somewhat swollen; it falls to the ground and dies, in many cases without much struggling.

Treatment consists in giving medicine to allay the inflammation, such as the following drench every 3 or 4 hours:—

Camphor	...	...	...	1 drachm
Belladonna extract	...	...	...	$\frac{1}{2}$ drachm
Solution ammonium acetate	...	...	...	2 ounces
Tincture of aconite	...	...	...	20 to 30 minims
Water or gruel	...	...	...	half to one pint.

Or one ounce of tincture of opium can be substituted for the tincture of belladonna, when three or four doses of the latter have been given.

To ease the pain, it is advisable to apply a hot blanket to the belly, wrung out of hot water; then an oilskin placed outside of this, to keep the heat and moisture in. Continue this for 3 or 4 hours. Then thoroughly dry the part, and well rub with some embrocation such as equal parts of turpentine and linseed oil.

MENINGITIS (Inflammation of the Brain).—During the course of influenza, congestion or inflammation of the brain may take place, most frequently some 3 or 4 days after the temperature has been considerably raised. The animal is noticed to be very restless, walks round and round the stall or yard, occasionally stopping with its head forced against the manger or fence. The eyes are bloodshot and staring; the animal sweats; the temperature is raised, and pulse increased in number and harder than usual. The animal, during this condition, is liable to hurt itself, but the stage of excitement is followed by coma, when the temperature drops, the pulse beats are less and not so hard, breathing heavy, somewhat like snoring. The head is lowered and the eyes very glassy. From now onwards the horse has periods of quietness, then excitement, finally the animal dies from heart failure or injury during one of the excitement periods.

If possible, place the animal in a dark box, where it cannot easily hurt itself. Apply cold or iced water to the head for some hours, and keep as quiet as possible. Blood-letting is sometimes advisable in well-nourished animals. The bowels must be freely moved, by giving a purgative, such as 5 or 6 drachms of aloes and 1 ounce of aromatic spirit of ammonia in a pint of water. Then keep the bowels right by giving 1 or 2 ounces of Epsom salts twice daily in drinking water. When the excitement stage has abated, give 1 drachm of potassium iodide in half a pint of cold water twice daily for a few days.

LAMINITIS (Fever in the Feet).—This is a congestion or inflammation of the laminae of the feet (the laminae are easily seen, and will be better understood if the hoof or horn is removed from the foot of a dead horse; they are very numerous, and those on the foot, or pedal bone, dovetail into those of the hoof or horn, and are so arranged to bear weight).

When the fore feet are affected, they are kept well forward so that the heels bear the weight. When the hind ones are involved, they are brought well under the belly in such a position that the heels only take the weight, the fore feet being kept well back under body to preserve the equilibrium.

If all four feet are affected (which is very seldom the case), they are all placed somewhat forward. There is great restlessness—first one foot, then the other, being shifted to get temporary relief. The animal shows symptoms of great pain; the respirations are increased (to such an extent in some cases that it appears like lung trouble coming on). The pulse is quickened and harder than normal. The temperature is raised, and the animal sweats. The feet, if tapped with a hammer, or pinched with pincers, are very sensitive, and the animal evinces great pain.

This affection requires prompt attention, and various treatments have been recommended from time to time by many authorities. One of the commonest methods, and probably as good as any, is to remove the shoes and place the feet in cold sloppy bran poultices. Change every 3 or 4 hours, or at intervals pour cold water over the poultices to keep them moist. The bowels must be kept working, although a large purgative is to be avoided, particularly after influenza. Nitrate of potash ($\frac{1}{2}$ ounce) and Epsom salts (1 ounce) in the drinking water, two or three times daily, will probably be found sufficient.

When the inflammation with its accompanying exudate has been great, there is a separation of the laminae. As mentioned previously, these are weight-bearers; consequently the sole of the foot drops, and the animal is of little value except for farm work. It is recommended that, as soon as the acute pain is over, the animal be shod with shoes considerably thickened at the heels, or perhaps a bar shoe, with a broad web, well bevelled out, to protect the dropped sole.

ARSENICAL SPRAY ON POULTRY.

A correspondent of "Garden and Field," who has been using an arsenical spray on his fruit trees, asks whether it would be injurious to chickens to allow them to run over the ground which he believes must contain arsenic, and also mentions that they would probably eat vegetation which had been coated with the spray. We do not think that there would be any danger whatever. Theoretically perhaps there ought to be, but the amount of free arsenic in any given place would be infinitesimal. Grown fowls we know take no hurt under such conditions, and it has been shown that larger animals eat grass which has been sprayed and do so with impunity.

ORPINGTONS.

In selecting Orpingtons, while taking into account the original Orpington type, one should guard against coarseness. Everyone has seen birds, chiefly among hens, where a fine, deep, square body, with a good front, was marred by excessive feather and decided coarseness in head and neck. The reasons against this type are that the laying is almost invariably unsatisfactory, and coarse birds generally have so much loose, rough feather, and are not profitable as table birds, owing to unsatisfactory growth of flesh and quality.

In judging hens and pullets select the low-set, square body, with the long, horizontally-carried keel, with a good, prominent but symmetrical solid front: the back should be broad across the shoulders, short and gently rising at the cushion to the tail, which is quite small. The head should be small and fine, nicely carried on a tapering neck, and the hackle should be close and free from ropiness and harsh, straggly feathers, general appearance, bright, intelligent, but quite gentle. In selecting the male birds, any legginess must be strictly avoided, as tending to ruin any breed as a table bird. It is not yet an easy matter to breed these nice, low-set, compact, deep, and well-rounded bodied cockerels; but, with care in mating, the proportion of these good ones will soon rise.

It may be said that some of the latter birds which appear deficient in front—that is, those which seem to lack development of breast: a true Orpington characteristic—prove on handling to have fairly long, well-furnished keels. But still the type, as it is called, is wrong, because such birds carry themselves at an angle close to the vertical, instead of almost horizontally, with the slightest rise forward.

Low-set birds, without a dumpy, deformed, awkward appearance, and with strong legs and feet, are points we should aim at, with a long-keel and prominent, full, rounded breast, viewed in profile, and broad and deep from the front view. The back is short and broad, and rising in a curve to the tail, which should not be carried too high or be too profuse. The head should be fine, with a strong beak, bright eye, and firm, evenly serrated, perfectly erect, well-arched comb, free from any twists, side springs, or malformations. The head must be well proportioned, fine, but thoroughly masculine, denoting vigour and sex characteristics.

The size should be large; some birds being remarkably heavy, indicating solid flesh. Too much attention to mere size, to the exclusion of other valuable points, is to be deprecated, as the end in view should be as previously stated, eliminating defects, and endeavouring to breed to the type most suited for a table bird breeder. Bred on such lines the laying will be found quite as satisfactory as one can wish in a breed whose chief utility qualification is in the direction of high-class table birds. Possibly some of us may live to see the introduction of the perfect, all-round bird, which shall lay like a competition winner, and yet produce the type, flesh, and quality of the Old English Game and Dorking. Experience, however, as it accumulates points very strongly against such a hope; but with care in breeding we have, however, in Orpingtons breeds from which we can produce what are probably the most satisfactory all-round fowls to date.—"Garden and Field."

The Orchard.

A FEW HINTS ON STRAWBERRY-GROWING.

By WILLIAM FRENCH.

The strawberry belongs to a genus of low perennial stemless herbs, with runners and leaves divided into three leaflets; calyx open and flat, petals five, white; stamens ten to twenty, sometimes more; pistils numerous, crowded upon a cone-like head in the centre of the flower; seeds naked on the surface of an enlarged pulpy receptacle called the fruit.

The strawberry belongs to the great rose family, and the name of the genus is *Fragaria*—from the Latin, *fraga*, its ancient name.

Fragaria vesca is the wild strawberry of Europe; *Fragaria californica* is found growing on the mountains of California; and another variety, *Fragaria chiliensis*, is also found growing wild in Upper India, and is also found wild in Germany.

Therefore, by cross-breeding and fertilisation, those wild weeds, as you might call them, have been raised in thousands of varieties, and to-day the cultivated strawberries rank as one of the leading first-class fruits of the day, and I believe they can still be greatly improved in size, flavour, and productiveness, by which, instead of giving us a harvest of six months' picking, they can be brought to fruit for eight or nine months. Taking into consideration the small plants and the amount of fruit they produce, I consider them a marvel, but "much always wants more." How the name of strawberry came to be applied to this fruit is unknown. Some say it was because children used to string them upon straws to sell; others believe it arose from the practice of placing straw around the plants to keep the fruit clean. But there is nothing conclusive on this point. The strawberry does not appear to have been cultivated by the ancients or even by the Romans, and it is only within this last hundred years that there has been any improvement in the varieties under cultivation.

FIELD CULTURE.

Soil and Preparation.

In my opinion, the main point to be observed is to secure a depth of soil with good drainage and plenty of nutriment for the plants. If planting in new soil, give nothing less than two ploughings, say 4 inches deep. After the first ploughing allow the land to lie exposed to all weathers for a month or two, after which give a good harrowing across the furrows, and after a few days run the roller over to break all lumps, the reverse way of harrowing. Then give a second ploughing, nothing less than 8 or 9 inches, or deeper, if possible. Better still, run the subsoiler after the plough, as I find it to be of great advantage in allowing the roots to penetrate deeper, and also in retaining moisture against dry spells.

Let it lie for a week or two exposed to the atmosphere. Then, after a shower, roll again, and, if required, harrow again, to make sure that the soil is properly pulverised, as this is, I consider, the foundation of success, and therefore a most important point is to have the soil under proper tilth, or, as the saying is, to have the soil like an ash-heap, so that the roots of the plants can lay hold of the soil at once after they are planted. If the soil is left rough and lumpy, the roots cannot get to work. Therefore, after a few days of wind and sun the plants are parched up, and hence the aggravating work of filling up misses, which I consider is very disheartening and a serious loss of time. New soil is greatly improved by growing a crop of fodder, say oats, barley or cowpea, which, if not required for feed, can be ploughed in as a green manure, by which means you will find your soil will work as mellow again.

Small Garden Culture.

Trench the beds about 5 feet wide and 18 inches deep. If the subsoil is of a clayey nature, leave it at the bottom of the trench, but if fairly good mix it with the top spit along with plenty of vegetable matter, rubbish, &c. Let it lie for a month or more to mellow. Then fork and pulverise well until the soil is free from lumps. Now let it rest for a week or two. If farmyard manure is procurable, scatter it on the surface 2 or 3 inches thick, and fork it in well, so as to mix the soil and manure thoroughly. In a fortnight it will be ready for planting. Plant four rows in a bed. By having narrow beds, trampling upon the planted soil is avoided. Set the plants about 1 foot apart in the rows. Planting close in the garden necessitates replanting every year, whereas in field culture more room is given. Several varieties can stand for two years giving good results, by keeping the soil between the rows constantly cultivated, which I maintain must be done if good results are to be obtained.

Preparing for Planting in Field.

My plan is to draw out drills with the plough as deep as possible about 2 feet 6 inches apart, and put the manure in the trench. If artificial manure is used, draw a long-toothed rake along the furrow to mix the manure and soil well together. This is not necessary with farmyard manure; merely run the Planet-Junior between the drills to cover in the manure, and leave it as level as possible. If this latter point is not attended to, you will find that after heavy rain the plants in the hollows will be buried with their crowns too deep, and consequently they will be weeks before they make a start into growth.

Manures.

The strawberry is a plant that will not refuse a fair amount of manure, providing it is presented in a proper form. My experience is that the plants make a start into growth much quicker, and are well-established before the winter, where I use the farmyard manure, but I am sorry to say it is too scarce. The principal manure I use to plant on is bonedust, at the rate of about 10 cwt. to the acre. I find that by putting the manure well down below the surface it greatly encourages the roots to strike downwards, and the lower they get down the more moisture they obtain, and are thus not affected by the heat and drought half so much as when the roots are encouraged close to the surface. After the first crop is gathered I mix my own fertilisers, consisting of superphosphate, sulphate of potash, and sulphate of ammonia, in the following proportions:—Two parts superphosphate, 2 parts sulphate of potash, and 1 part of sulphate of ammonia. Make sure to break all lumps so as to have it well mixed, as this is an important part. I have a small hand plough, which I run along the rows, and it makes a furrow about 2 inches deep. Sow the mixture in the furrow, and by running the plough the reverse way it covers over the manure.

Planting the Strawberry.

While it is impossible to fix a hard-and-fast time to transplant, as the seasons differ so much, I shall have to leave it to the grower's own judgment. If your ground is in good order and the weather showery, you can start on the 1st of March. I also prefer young runners. Some growers say they get the best results from old crowns split up, but that is not the case with me. I plant about 2 feet 6 inches between the rows and from 1 foot to 18 inches in the rows, to allow the horse and scuffer to go between the rows, so as to keep the soil always open, which I consider of great importance. In transplanting, some recommend shortening the roots by one-half. I consider this practice all right in the cooler countries, where the ground is, practically speaking, always moist and cold below; it is also a good practice in cases where the roots are allowed to get dry or are injured in any way. In such cases a clean cut would, in my opinion, be beneficial. My way of planting is to allow the roots to hang down straight in the hole, the deeper the better on account of coolness and moisture,

provided the crown is not smothered. Some cultivators use a dibble for planting, making a round hole, into which the roots are thrust in clumps. Others just scratch a handful of soil off the surface and plaster it back on the roots, the latter lying in a horizontal position, instead of hanging perpendicularly in the hole. Plants might live under such treatment, providing we had showers every day, but careful planting with a trowel is far the better way.

Varieties that Do Best with Me.

Aurie.—This was planted at the end of February of this year, and we were picking fruit off them on 23rd April. The berry is large, well-flavoured, and of fine colour. It carries well, and is good for box and factory. No disease has appeared on it.

Glenfield Beauty.—Of good robust habit; good both for box and factory, providing they are allowed to ripen properly. They commence to ripen in June, are very prolific, and prefer heat and moisture.

Trollope's Victoria.—An old favourite, rather late compared with the later and locally raised varieties, producing good box fruit; useful also for the factory. My experience is that it is shy in bearing in a moist season. If anyone is planting this variety, I should advise them to keep it on the high ground.

Annetta.—Previously known under the name of "Butt's Seedling." It is rather erratic in bearing. During some seasons it does splendidly, at others the reverse. Last year I did well from one patch, whereas another lot gave poor returns. This year I have 5,000 or 6,000 looking splendid and showing good fruit.

Marguerite.—Good for the first of the season, but after giving a good first crop it cannot be depended upon for the remainder of the season.

Federator.—This variety is like the Glenfield Beauty. It produces a splendid crop in a good moist season, but stands a heat wave very badly. It prefers a low, moist position.

Pink's Prolific.—Good for a private garden, but too small and late for a large area.

Noble.—Good for an early variety, producing a splendid large and good-coloured berry, but a short cropper.

With several others, including "Made to Order," one Mr. Pink crossed between *Aurie* and *Trollope's Victoria*. At the time of planting, the weather was all that could be desired. A good cropper, also free from disease.

Usher's Special; also, *Phenomenal*.—The last two varieties I have not had in my possession long enough to say much about, but they are promising. Also one imported from America is of splendid colour, flavour, of good size, with splendid promise.

Profits of Strawberry Cultivation.

Persons who have had no experience in raising strawberries for market are desirous of ascertaining in advance the prospects of profits on investments. Unfortunately for the would-be investor, results depend greatly upon circumstances, such as markets within reasonable distance, plenty of labour at moderate prices when needed, land at reasonable prices, also fertilisers, and favourable season. The greatest profit made in the cultivation of the strawberry is by small growers within a moderate distance of the towns, who have children to assist in gathering the fruit when needed. An acre of strawberries under high cultivation, with the fruit gathered and marketed in the very best condition, will often yield more clear profit to the grower than 10 acres under opposite conditions.

Mulching.

Forest oak leaf makes a splendid mulch when procurable. If not, half-decomposed leaves would keep the fruit clean from grit, and also do a great deal of good in furnishing the plant with humus, which is a favourite of the strawberry.

Referring to planting old crowns, I have been making a further test this year with the Marguerite and Trollope's Victoria. A very good variety for colour. Then they took about a month longer to establish themselves than the young runners. Therefore, if the weather is dry, they are very unsatisfactory. Yet they came into fruiting first with a very light crop.

A Few Remarks on Small Fruits.

I consider there ought to be something done regarding the fixing of prices. For instance, for, say, jam berries, prices should be a little more regular than at the present time, so that growers and manufacturers could work with more confidence together, instead of carrying on this cut-throat competition, the outcome of which is certain to grind the hard-working tiller of the soil down, until eventually he is forced to give up growing the small fruits and take to growing large fruits, where less labour is required for cultivation and marketing. I consider this evil could be overcome to a great extent by a conference between manufacturers and growers, considering the demand for this fruit is about 400 per cent. higher than the supply, taking a manufacturer's own statement for it, and also the scarcity of same on our local markets.

Strawberry Insects and Diseases.

Crown Borer (*Tyloderma fragariae*, Riley), White Grub.—One fifth of an inch long, boring into the crown of the plant in midsummer. The mature insect is a curculio or weevil. In reference to this pest, to the best of my belief, Australia is free from it.

Remedy.—Burn over the field after the fruit is picked. If this does not destroy the insects, dig up the plants and burn them.

Strawberry Leaf-blight, Rust, or Sun-burn (*Sphaerella fragariae*, Sacc., including *Ramularia*).—Small purple or red spots appearing on the leaves. These eventually become larger, making the leaf appear blotched. Most serious after the first crop of fruit is picked.

Remedies.—Spray with Bordeaux mixture at intervals of two weeks, as soon as the fruit is picked. The leaves are easily destroyed, without injury to the plants, by quickly burning off a thin layer of straw, which is spread over the patch after the fruit is off.

I am pleased to say that we have several varieties, practically speaking, free of this disease. This includes also our locally-raised ones, which I have already made mention of.

The strawberry, as indeed all plants, takes certain substances from the soil—viz., "manurial ingredients." These may be defined as those substances from which the plant derives its supplies of nitrogen, phosphoric acid, and potash. Now, it must be remembered that all plants require adequate supplies of these three manurial ingredients, but different plants require them in different proportions.

For example, sugar cane requires a great deal of potash, relatively little phosphoric acid, and much nitrogen.

An acre of strawberries will contain—375 lb. potash, 222 lb. nitrogen, 83 lb. phosphoric acid.

In 7 tons of farmyard manure there will be an average of—74 lb. potash, 77 lb. nitrogen, 57 lb. phosphoric acid.

Compare these figures, and it would be seen that farmyard manure would be a badly-balanced fertiliser for strawberries, because in order to supply sufficient potash considerable excess of nitrogen would have to be supplied, and a very large excess of phosphoric acid; so that it would appear as if a much more economical manurial dressing could be prepared if, instead of farmyard manure alone, a combination of farmyard manure and artificial be used. But where farmyard manure can be produced on the farm, then, for a first crop, it is preferable to all other manure.

For strawberries, when farmyard manure cannot be obtained, a good dressing consists of—3 cwt. bone dust, 3 cwt. superphosphate, 1 cwt. dried blood, $\frac{1}{2}$ -cwt. sulphate of ammonia, 2 cwt. sulphate of potash per acre, or in these proportions.

DISTRICT FOR STRAWBERRY-GROWING.

The writer maintains that the district between Manly and Redland Bay is the most favourable in the State for strawberry-growing, considering it is practically free from hailstorms, and is seldom visited by those hot winds which injure the strawberries after the thermometer passes, say, 85 degrees Fahr. Quoting Bulletin 62 of the Central Experimental Farm, Ottawa, Canada:—"The first ripe fruit had been obtained on 16th June, and the last picking of the latest varieties was on 19th July. The province of Quebec is much later, the first fruit not being ripe until the first week of July, and the season continues to the second week of August." Thus the strawberry seasons for the two provinces cover about two months. Just for the sake of comparison, I refer to the year after I read my last paper on this subject, 1909, when I took a prize for a box of strawberries at the Chrysanthemum Show, in Brisbane, on 23rd April, 1909. In the following February, about the middle of the month, I finished my season's crop by sending up a keg of strawberries to the factory. Thus only one clear month out of the twelve elapsed that I did not market strawberries. This, I consider, constitutes a record for a strawberry season in Queensland. I can only account for this by the raising of seedlings locally, because the plants are well acclimatised, and will stand the severe changes of the seasons. The North Coast Line seems to be falling off in strawberry-growing, and the growers are taking to larger fruits, in the cultivation of which there is less labour required. There is certainly no crop demanding such constant attention as the strawberry; but, on the other hand, the grower has not to wait long before he receives the fruits of his labours. By planting in February or March, the early varieties will fruit in three months, providing the season has been favourable for planting and the ground in first-class condition. As to the yield from an acre of strawberries, there is a wide margin to come and go on, as some growers are more successful than others. One factor in the difference of yield is the different varieties grown. One variety will do well this year, yet in the following year the grower will find with the same variety he is 50 per cent. short on his returns. Another point to be considered is the method of marketing the fruit. Strawberries will not stand rough handling, especially during the heat of the summer. As to yield, I will endeavour to strike the happy medium, and set it down at from £80 to £100 per acre. Some, no doubt, will say this is too high; others consider it too low. Between the two I might, perhaps, find my average. Referring to the amount which each individual plant bears, the old average has been $\frac{1}{2}$ -lb. fruit to each plant, which I consider a very low average, because, if the ripe fruit on some plants is weighed, the half pound is arrived at without taking the whole of the season into consideration. Turning again to the Bulletin above mentioned, Mr. W. Wheeler, Concord, Mass., states that of some varieties he picked more than 2 quarts per plant. Now, roughly speaking, a pint is equal to 1 lb. in weight. That means that he picked, in round figures, 4 lb. per plant. Our $\frac{1}{2}$ -lb. average per plant was struck years ago, when the old sorts were grown, which are now discarded altogether as practically valueless. That will, I think, account for the difference. We may, therefore, reasonably put the average up to 1 lb. per plant. A table in the Bulletin gives the best average weight of 25 berries of 50 varieties at from $4\frac{3}{4}$ oz. to 8 oz. Our varieties, such as "Usher's Special," are so large that a pint box will only hold from 12 to 15 berries well packed. Allowing 12,000 plants to the acre, that would bring our yield up to 12,000 lb. per acre at the average of 1 lb. per plant.

Picking Strawberries.

This is rather a difficult subject to deal with, as a slight difference in the ordinary rates makes a wonderful alteration in the year's account. About two

years ago strawberries could be picked for $\frac{1}{2}$ d. per lb., but this year (1910) 1d. is demanded by the pickers; so I engaged them by the week, and this seems to be satisfactory. Of course, the business pays best where there is a young family growing up. It not only pays better, but it is also healthier for the children than sending them to towns to work. Speaking from my own experience and from what I learn locally, there seems to be no serious difficulty in picking when pickers are engaged for the season. The cost of picking has, as I said, increased by 100 per cent., and the only way I can see by which to balance the account is to go on advancing in higher cultivation, resulting in larger crops and larger fruit, and that means less labour.

Trays, Punnets, or Boxes.

When the strawberry growers first took up this branch of agriculture around the metropolis, the majority used the trays for packing the fruit for market. One reason for this was that they could procure the timber on their own land, and split for themselves—a work which gave employment in making trays for wet days; but, as time rolls on, timber is getting scarcer and the demand greater, for where there was 1 acre of strawberries in those days there are 50 acres to-day. Of course, paper-box manufacturers were quick to note the demand for trays, and stepped into the breach with good results since. As time went on the more land went into cultivation, and the less time there was for making trays. I think that the pint boxes are a great deal more convenient for the shops and also for the individual customer than trays, seeing that the convenience of the public must be studied. If a person wishes to purchase, say, 1 pint or 1 quart of strawberries, the shop has to repack, which is most injurious to the strawberry. The least handling the fruit gets, the better for all concerned. In reference to punnets, I don't think they will ever come into favour in this State. Our great objection to it is the berries lying one upon the other. Some of the varieties will stand it to a certain extent, while others will not carry so packed. If one berry breaks the fruit starts to deteriorate, and, by the time the customer gets them, they are anything but enticing as regards flavour, size, or appearance. Of course, in England the climate is very different to that of Queensland. It is not often that they have a temperature of 80 or 90 degrees in the shade in which to pack strawberries.

Usher's Special.

When last I wrote, the above variety was under trial, and I am pleased to say it has turned out first-class—a vigorous grower, a splendid box strawberry, and of good flavour. When it is at its best, only from 12 to 15 berries can be packed into a pint box. The fruit stands the dry weather well; no disease attacks it. Hence it is to be highly recommended to growers and buyers.

Royal Sovereign.

This is one of the old favourites which has of late come to the front again. It is a splendid berry as regards flavour and colour, and also carries well. Some growers do better with it than with any other varieties; with others just the reverse is the case. The advice I would give to growers is to plant cautiously, and to decide by experimenting.

BANANA CULTIVATION.

Complaints having been heard that bananas received in Brisbane from the far North are of inferior quality to the product of the more Southern parts of the State, Mr. C. Ross, Instructor in Fruit Culture, has prepared the following memorandum as a help to the more intelligent and successful methods of banana culture:—

An ideal banana soil should be plentifully supplied with humus and natural plant food and contain abundance of moisture. At the same time

the drainage must be perfect; a too retentive subsoil should be avoided or artificially drained.

Plants required for a new plantation should never be taken from old worn-out stools. The best and cheapest plants, which give the best results, are suckers or bulbs separated from the strongest and most vigorous plants that are producing the largest bunches of the finest fruit. The worst possible system is that of continually planting suckers taken indiscriminately and without careful selection, and this is the most serious of all causes of deterioration in size, quantity, and quality of the crop.

The first essential is thorough preparation of the soil, supplemented with a generous supply of plant food. Nitrogen is needed for the production of stout stems and large leaves.

For the production of fruit, the most important constituent of the soil is potash, and if this be deficient it must be abundantly supplied.

Localities subject to strong winds are not desirable, as the large delicate leaves when blown into ribbons cause a check to the vitality necessary for producing large bunches.

No intermediate crop should be allowed to grow in the plantation even when young. Weeds and trash should not be removed from the ground, but used as mulch around the plants, and when this mulch is rotted it may be incorporated with the soil, which will help to retain moisture and maintain the soil in a porous condition, failing which no amount of artificial fertilisers will be of much service.

In the North, where some attention is now being paid to rubber-growing, the idea is to plant rubber trees between the rows of bananas, so that when the latter begin to go off they may be removed and whilst they are still vigorously bearing the crop will more than pay the expense of establishing a rubber plantation. In such a case, the bananas become the subsidiary crop, and the rubber the permanent crop. Neither will do either crop any injury as regards the exhaustion of plant food. The rubber tree roots deeply and draws most of its nourishment from a depth, and by the time it has sent forth its surface roots the bananas will be ready for removal.

A GREAT KEEPING GRAPE.

Reference has been made in the Australian papers on several occasions lately to the Daria grape as a late-keeping variety, well worthy of the attention of growers in the dry districts, with a rainfall of, say, 18 to 20 in. This has been well exemplified in the Sydney market this winter, grapes of this variety having been harvested at the Wagga Experiment Farm, and sent to the metropolis right up to the end of July, when they realised about 9d. per lb. The fruit ripens in March at Wagga, but bunches are allowed to remain on the vines, being protected meanwhile from birds by being covered with thin ruberoid. The fruit improves very much, both in appearance and flavour, by keeping, and in midwinter the flavour is excellent, and devoid of that out-of-season taste that detracts from most fruits that are kept past their season. The grapes do not shrink or lose weight, and the colour is first-class right up to the last; in fact, it improves, as, being originally a light

amber, it takes on a slight pinkish blush. The Government Fruit Expert, Mr. W. J. Allen, considers that it would be well for growers in suitable districts to go in for this variety, and, to protect them from birds, he is of opinion that it would pay to net the vineyard in. The Daria is a moderate cropper, yielding 25 to 40 lb. to the vine. As Mr. Allen says, if growers only got a half-case to the vine after allowing for waste, and sold them either locally or for export at 15s., it would mean a fine return from the 400 vines which an acre would carry.—“N.Z. Farm.”

A MACHINE TO DESTROY THRIP.

California, 12th August.—A machine for destroying the awful pest thrip. That is the achievement of a Dinuba man, and he is sure of the gratitude of all the vineyardists in this part of the State. The inventor of the machine is C. B. Driver, and he has demonstrated that his invention will do the work, and do it thoroughly. Mr. Driver has been working on the idea for a number of years, and only lately has he gotten the matter so in hand as to venture the making of a working model. The machine as it is now operated will literally “harvest” the thrip from the vines and gather them into a receptacle so that they may be burned. The machine now being used by Mr. Driver is one he has made from the crude materials to be found on the ranch, and it is not as light or convenient as it will be when he has commenced the improvement and manufacture of the same.

A sack containing

Twenty-five Pounds of Thrip

was exhibited, showing what the machine could do in one day's work from muscat vines, and the thrip were taken from the vines without harming the crop in the least—in fact, with decided benefit to the latter. A few days ago Mr. Driver applied the machine to his Thompson vineyard, and since that time the vines have livened up, until now it looks like a new vineyard entirely.

In the operation of the thrip machine the outfit, mounted upon an ordinary waggon bed, is driven through the vineyard, and the rows of vines covered with a canvas canopy. This also extends entirely over the thrip harvester, and the operation of a large blower by a 10-horse-power gasoline engine gives a suction which gathers in the thrip, and the insects are then blown back through a sieve and grinder and into a receptacle from which they are taken and burned. The machine makes a clean sweep of the thrip from the vines when going over the vineyard, and has proven what it is capable of doing when in more perfect form.

This Mr. Driver proposes to do by building a lighter machine, which can be mounted upon an ordinary vineyard truck, and which he will operate by means of an “automobile” engine, thus gaining the speed for the suction without the great weight now required of hauling about the big 10-horse-power gasoline engine from the ranch.

Mr. Driver has achieved remarkable success thus far with his efforts to produce a machine that will rid the vineyards of the destructive pests, and his efforts will be hailed with delight by the grape-growers all over the valley. It is his intention to go ahead with his work until he has a perfected machine ready for selling.

Thrips are usually much in evidence during hot, sultry weather, when they migrate in large numbers, and are hence known as "thunder fly." The Germans have a useful distinction between black fly (*Thripidæ*—black in the mature condition) and green fly (*Aphidæ* or plant lice). It is usually a species of thrips that gets into the eye during the summer, and their irritating effect on the skin has been already referred to. They are all very small, and vary from $\frac{1}{50}$ to $\frac{1}{3}$ in. in length, the latter constituting relatively giant forms not found in Britain. Examined under a magnifying glass, they are easily identified by their four long narrow wings with a conspicuous fringe at the margin. Some species, however, are never winged, and others again are winged according to sex, time of year, or food conditions. The larval form is similar to the adult and has the same food habits, but it is never winged, and in some species is either yellow, orange, or blood red in colour. A kind of pupal stage precedes the adult winged form, which is usually motionless, and in which no food is taken. Thrips feed probably by suction, like green fly; but this is a point difficult to determine, and which has not yet been finally settled. They pump up the juices both of the foliage and of the flower, and in oats, for example, cause the straw to become deformed and twisted, and the grain to shrivel. Pea and bean thrips often do very great damage, attacking the plant just as it is about to flower. On the contrary, one species is said to be even beneficial, and to suck green fly; whilst the thrips themselves are attacked by certain mites, bugs, beetles, and thread worms.—"Fruit World."

SUNSTROKE.

Now that the hot weather has arrived, workers out of doors occasionally feel the effects of exposure to a blazing sun. Although sunstroke is not of frequent occurrence in Queensland amongst acclimatised bushmen, farmers, and railway lengthsmen, yet it is well to know what to do in the event of such a calamity, which sometimes attacks a person as suddenly as a stroke of apoplexy. Sunstroke is often known by a sudden langour due to long exposure to great heat, especially should this happen when fatigued or exhausted. Pain in the head or dizziness is followed by a loss of consciousness and complete prostration. Often the head becomes burning hot, the face dark and swollen, breathing painful, and the feet and hands cold. The sufferer should be at once taken to a cool shady place (not to a house or hospital a long way off). While awaiting the arrival of a doctor, lay the sufferer down with the head a little raised. Apply wet cloths to the head and mustard or turpentine to the calves of the legs and soles of feet. Nothing more can be done safely without a doctor's advice.

THE MANUFACTURE OF PAPER FROM MEGASS.

Much has been said and written about the possibility and probable profits of manufacturing paper from megass, which material at present is largely used to supplement timber as fuel in sugar-mills. In view of many suggestions which have been made on the subject, the "Tropical Agriculturist," in the issue of that journal for January, 1910 (Vol. XXXIV., No. 1), publishes a most interesting paper on "Bagasse for Paper," by William Raitt, chemical engineer and fibre expert, Bangalore, India. The following contains the gist of the article:—

Bagasse or megass, the refuse crushed sugar-canes or chips from the diffusion batteries, has come into some degree of prominence of late as a possible raw material for paper. It may, therefore, be useful to consider, from the collective experience available, modified or confirmed by our own, how far the hopes held out regarding it in some quarters are likely to be justified. The growing scarcity of wood-pulp in Europe and America is giving occasion for a great amount of research and experiment with the object of finding a suitable substitute, and, while several have been suggested which combine all the advantages necessary to a commercial as well as a technical success, it is to be feared that an insufficient acquaintance with the scientific and economic problems involved has resulted in others being brought forward which hold out very little prospect of practical usefulness.

It may be as well to consider, first, as to what grade or class of raw material is wanted in supplement of, or in substitution for, wood-pulp. For this purpose, paper may be broadly divided into three main grades corresponding fairly accurately with the principal divisions of the raw material market:—

- (1) The best qualities of writing paper—manufactured almost wholly from linen and cotton rag;
- (2) Inferior writing paper, book printing and news paper—manufactured mainly from wood-pulp;
- (3) Coarse unbleached paper, wrapping and packing paper—manufactured from textile wastes, old sacking, and such like materials.

Now the growing demand for a new material arises solely from No. 2, since rag is now reserved almost exclusively for No. 1; the supply is quite adequate to the demand, and, apart from this, no other material is likely to be found which, at the same cost, combines the necessary requirements of strength and colour. For No. 3, where strength only is required, the market is also fully supplied, and the steady development of textile industries, with the resultant continual increase in the output of wastes, seems likely to keep it so.

The stage at which sugar-cane holds its maximum saccharine contents appears to coincide with a state of partial and irregular maturity of the fibres on the outside or just under the skin of the cane, which are firm, long, and of good strength, though somewhat harsh, those from the interior being short and weak. It therefore presents the most difficult of problems to the paper-maker. Since the chemical treatment must be uniform, it follows that it must be severe enough to reduce the outer fibres completely, thereby largely destroying the inner ones, or it must be mild enough to conserve the latter and leave the former only partially resolved into pulp. In the first case, the yield is largely reduced, and what remains is expensive to bleach, because the severity of the treatment has degraded the weaker fibres into insoluble brown compounds, which stain the pulp. In the latter case, the

yield is good, but the product is almost equally difficult to bleach satisfactorily, because of the admixture of partially digested outer fibre. The pulp is consequently full of specks and blotches, unfit for anything but the commonest bleached paper, and that only in conjunction with some better and more uniform material.

We do not think, then, that bagasse can be seriously considered as a candidate for class 2, but there are localities in which it may find a profitable entrance into class 3.

Cane-sugar factories are usually situated in localities where all manufactured goods have to be imported at a considerable cost for freight, and, probably, import duties also. Where such circumstances exist, together with a sufficient local demand for unbleached wrapping and packing papers, or even for the thin unbleached paper so largely used by the natives of India and elsewhere for correspondence and accounts, it is quite possible to show that a paper-mill may prove a very profitable auxiliary to a sugar factory, and that the bagasse may be worth considerably more for this purpose than its present fuel value.

A paper-mill suitable for this class of paper to produce 40 to 50 tons per week would cost, roughly, £20,000. A conservative estimate of the cost of production, under average conditions, exclusive of the real fuel value of the bagasse, but including repairs, depreciation, and 50 per cent. interest on cost of plant, amounts to £10 10s. per ton. Under the conditions above referred to, the product should be worth £15, leaving £4 10s. as the paper-making value of the $2\frac{1}{4}$ tons of bagasse required to produce it, or, say, £2 per ton. The cost of steam coal to replace it in the sugar factory furnaces would be, at the outside, £1 10s. per ton. In calorific effect, a ton of good steam coal is usually assumed to be equal to 4 tons of bagasse, so that the full value of the latter cannot exceed 7s. 6d. per ton. Deducting this, there remains an estimated profit of £1 12s. 6d. per ton of bagasse converted into paper.

THE SHORTAGE OF COTTON.

According to the papers, the Lancashire cotton industry is still depressed, and there is much machinery standing idle in both spinning and weaving departments. Several authorities believe that relief can only come through lower prices in the raw material, and there is plenty of room for a decline, in view of the fact that middling American in Liverpool was recently quoted at 8'17d., and fully good fair brown Egyptian at 12½d. According to a report lately issued by the United States Government, the condition of the crop is 75·5, as compared with 71·9 last year. The plants are doing well, and easier rates are being looked forward to before the end of the year. Although favourable news is being received from Egypt, the prospects are uncertain.

Meanwhile, the visible supply at the end of July was returned as being only 1,331,000 bales against 2,144,000 last year, and, although it is hoped that weather conditions throughout the cotton belt generally may favour larger crops, planters in British territories will be well advised to push on with their cultivations.

The world's cotton crop—including North America, India, Egypt, Brazil, and all other producing centres—is returned as follows:—

September-August—					Bales.
1903-04	...	...	...	...	18,152,000
1904-05	...	...	...	...	20,633,000
1905-06	...	...	...	...	19,457,000
1906-07	...	...	...	...	22,476,000
1907-08	...	...	...	...	19,859,000
1908-09	...	...	...	...	22,467,000
1909-10	...	...	...	...	19,329,000

Tropical Industries.

THE PIATT CANE-CUTTER.

The "Louisiana Planter" describes as follows the work of a new cane-cutting machine invented by Mr. Piatt, of the Piatt Engineering and Machine Company, Atlanta, Georgia, U.S.A. :—

This device for cutting, topping, and stripping sugar-cane was operated at the Audubon Park Experiment Station before the members of the station's staff and a representative of the "Louisiana Planter." The exhibition was in the nature of a private one for the benefit of the inventor, in order that he might have an opportunity to see his machine in operation, and observe any weak points or defects that might develop. Mr. Piatt has his apparatus in different and in incomparably better shape than he had last year. His method is also, we believe, different from that of any other cane-cutting device, in that it passes over the row once in order to top the cane, and then by a secondary passage over the row strips and cuts at the bottom the standing topped canes. At the same time that it is cutting and stripping it will top the adjacent row. No hitch occurred in the operation of the machine. It seemed a little difficult of guidance, but that was due more to the inexperience of the coloured man who operated it than anything else. It cut the canes easily enough at the ground line, and it stripped the leaves off very well, though, as the cane is green now, the leaves adhered too closely to be completely taken off. In topping the cane Mr. Piatt cuts all the canes at the same height, adjusting his topper to what he considers to be the right average height. The topper is moveable, up and down, but no attempt is made to adjust it to reach each individual cane as it comes along. This method of topping is, he believes, the only one possible by mechanical means. Mr. Piatt's machine needs a stronger engine for its propulsion. It has two engines—one for propulsion, and one to operate the mechanism. He has every reason to feel encouraged over the work done by his machine at the trial.

Commenting on this and other cane-cutting machines, the "Planter" says :—

Our American inventors have proven that they are capable of doing almost everything in the world with mechanical devices except to give them mentality. They have made machines to perform work far more swiftly and more dexterously than human hands; but they never have given them the least of the faculties of the human brain.

For instance, machines that will pick cotton have been invented and have demonstrated their ability to pull the fleecy fibre from the open cotton bolls. But they have not been given the judgment to reject the withered foliage and dead trash of the branches which bear the bolls, which foreign material is of near the same weight as the cotton to be gathered. In this operation even the lowest form of human intelligence knows what material to select and what to reject to make the harvest profitable to mankind. Therefore, as long as the clean cotton picked by the fingers of coloured folks or white farmers, as the case may be, is worth 3 or 4 cents per lb. more than the trashy cotton gathered by the mechanical harvester, and hand-picking does not cost one-half that difference, the cotton-picking machine must be a failure.

Now, let us apply a similar reasoning to the mechanical cutting of cane. A machine may be made to cut cane at the roots and possibly to properly clean it of trash for the mill. That is all a plain mechanical process, demonstrated annually in the successful cutting and laying in rows ready for the "shocking" the ripened stalks of millions of acres of corn in the western states

of our country. But when it comes to topping the cane at the upper-line of dead trash or the last red joint, that requires the human brain processes of sight, selection, and judgment. Set the average cane-cutter on a row, and, under indispensable superior supervision, he will top the 6-foot stalks in approximately the right place and the 3-foot stalks likewise; ditto with the standing and prostrate stalks of tangled blown-down cane. He will trash it fairly well if forced to do it; and do the work at a cost of from 60 to 75 cents a ton, when he should do it for from 30 to 50 cents, according to the variation in the stand and condition of the cane to be cut.

In that topping process no cane-cutting machine ever invented can be equal to a man's sight and the sense of selection. In the many thousand stalks of ripened cane growing on an acre it cannot top the 6-foot stalks, the 3-foot stalks, the straight-standing and the prostrate stalks in blown-down cane, at or near the right point. Striking a general average of height in topping will never do. That would involve the throwing away of a large part of the grinding lengths of the taller and standing stalks, cutting the short stalks top and all, and sending no end of useless and generally damaging stuff to the mill; and leaving the prostrate storm-blown stalks untouched.

That style of harvesting would make cane-cutting cost indirectly much more than the 60 or 75 cents per ton paid for the work to the present inefficient, unsatisfactory, and expensive field labourers.

Therefore, in getting up a machine for the cheaper cutting of cane the inventor should not aim so high as to entirely overshoot the mark of success at which he aims. He can give the sight and discernment of intellect to no such invention. If he strives only to cut the cane at the bottom, lay it all in even rows with the butts at one end and the uncut tops at the other, he will achieve all that can be done, and that with triumphant and profitable success.

With cane thus cut, and so placed to be topped and cleanly trashed by following manual cane-cutters, he will reduce the present enormous and iniquitous cost of cane-cutting at least one-third, and that of wind-rowing by more than two-thirds.

That should surely be object enough to stimulate invention to certain success and great profit without the vain idea of striving after the impossible.

We have now in the State several cane-cutting machines which do this last described work more or less satisfactorily, and such inventions are being annually improved. Within a year or two they should be doing efficient, profitable, and indispensable work in every canefield of our Louisiana sugar region.

But the talent applied to such inventions should not be wasted in striving after the unattainable. Devoted exclusively to the practical bottom-cutting of cane and placing it in regular rows for subsequent cheaper and more rapid manual preparation for the mill, that talent would surely bring about the so-much-desired end very much earlier than it has done or is doing.

Cane-cutting machines that can reduce the cost of field preparation for the mill of the vast tonnage of raw material handled (about 5,000,000 tons a year) by 30 or 40 per cent. should satisfy the desires of our most progressive inventors and be hailed with enthusiasm by all the appreciative sugar planters of our State.

BY-PRODUCTS ON THE COTTON ESTATE.

It is doubtful whether cotton seed and cotton-seed oil can be rightly called by-products; we use the term, however, because the ordinary cotton-planter is chiefly concerned about the lint, and cultivates his lands, and racks his brains, to secure the largest quantity and the best quality of this portion of the crop, leaving the exploitation of the seed to others. Therefore we feel justified, when writing from a cotton-planter's point of view, as we are now doing, to classify everything but the cotton-lint as a by-product.

The gas industry in England, the stockyards of America, the steel works, and other industries around us, often show that the chief profits, at times even the only profits, are obtained from the by-products rather than the main branches of the work carried on at the factories. Keen competition, both international and individual, is fast forcing out the weakest and least well-organised members of all trades, and, although signs are not wanting of a reaction in this, cotton production, which represents the most important of all industries, after maize and cereals, seems at times capable of being better organised in many ways to the advantage both of the planter and the public—*i.e.*, the actual producer and the actual consumer. Whether the middlemen, who at present seem to be making the bulk of the profit out of the by-products, will benefit, has nothing to do with this article, written only to help producers.

The strong position of cotton-seed oil in America at the end of August, and of oils generally at all the distributing centres, has probably been carefully noted by cotton-planters, especially in those centres where large areas are under cultivation. Possibly the idea has occurred to them that co-operative central factories could be established, the working of which would be so complete that the seed cotton would be put in at one end to be turned out at the other in the shape of bales of cotton for shipment, oil for human consumption or industrial purposes, soap for local consumption, seed cake, &c., for cattle food and manures. The same as the pig at Chicago, we are told, goes in complete at the beginning of the factory and emerges in fifty different forms, so we feel certain that, with care and attention to the utilisation of the by-products, the same thing could be achieved with raw cotton. Soya bean and ground-nut growers, cocoa-nut and palm-oil estates, flax-planters, and others should all pay attention to the uttermost exploitation of their crop in the same way.

There is certainly a growing demand for native manufactured products such as soap, candles, glycerine, &c.—a demand which must be filled in the near future from factories on the spot. Who is so well equipped for this work as the growers of the oil-producing crops, especially by means of co-operative central factories? The present procedure possibly is to express the oil, or more frequently to ship the seeds, nuts, &c., to Europe, where they are worked up under up-to-date conditions, and re-exported to the country of their growth, carrying a heavy load in the way of manufacturers' profits, double freight, duties, &c.

It is, however, no use attempting such manufactures with antiquated machinery, nor is there any need to do so. A thoroughly efficient outfit costs little if any more in the first instance than a badly-designed one.

As to cost, £1,000 carefully expended will provide a complete set of machinery necessary for small soap works, capable of turning out from 5 to 10 tons of soap per week, and yielding a profit of something in the region of £1,000 per annum—that is to say, the plant will pay for its prime cost in the first year.

There is much also to be done in the preparation of edible oils, extraction of oleo for margarine, &c. Candles may be prepared from stearine of just that necessary firmness required to stand tropical temperatures, a matter which is too seldom carefully studied by the exporter to those countries.

Those cotton-growers who already express and refine their cotton-seed oil may further increase their profits by working up into soap the foots and waste from this process. Quite a respectable free-lathering soap can be made in this way with a little assistance from the harder oils, such as come from copra or palm kernels.

At present the high price of cotton and oil may not encourage such care, but with the increased area being put under cotton in the English colonies and Egypt, and the anxiety of everyone to place the industry on a permanently successful basis, the question of extracting the oil and utilising the residue

should not be neglected, especially as it seems probable at times that the world-demand for fats and oils is inclined to leave supplies far behind, and so induce a large area of cotton to be planted on account of the high price of oils at the present time.

"The first of September," we gather from "The New York Oil, Paint, and Drug Reporter," "brought to a close probably the most eventful year in the history of the cotton-seed oil industry. The market during the twelve months ending on the date named has been rendered memorable by the highest prices ever paid for the product. The top notch was reached as the old-crop year expired on 31st August, when 12 cents was bid for spot oil without attracting sellers. To account for this is comparatively easy. The heavy demand was occasioned by the high cost of lard, butter, and other competing fats, and in the consequent search for substitutes it was natural that manufacturing consumers turned toward cotton-seed oil. City lard, for instance, sold last March as high as $14\frac{3}{4}$ cents, while lard compound was selling at 10 cents. The difference of $4\frac{3}{4}$ cents naturally brought about a heavy demand for the latter, as well as for many descriptions of cooking oils. It might also be recalled with some bitterness by the average householder that the price of pure butter reached the abnormally high figure of 40 cents per lb., while at the same time prime tax-paid oleomargarine could be had at 23 cents. The difference of 17 cents per lb. is significant, and it is not to be wondered that the housekeeper of moderate means chose the less expensive article. It might be well for those interested in the cotton-seed oil trade to bring this fact to the attention of their respective Congress men. They cannot lay too much emphasis on the situation. Butter at 40 cents is too expensive a luxury for the people with limited incomes, and, because they must choose another product equally wholesome and palatable, they should not be compelled to pay a heavy tax on each pound consumed in order to enable the manufacturers of butter to hold their product at, to them, a prohibitive price.

"Another bullish feature which might perhaps be taken as a sort of sum total of the situation is the fact that cotton seed which a year ago sold at 18 dollars and 20 dollars is now held at 30 dollars and 40 dollars per ton, and the movement promises to be somewhat later this year. Crude oil, which is now held at 60 cents per gallon, was selling at this time last year at $34\frac{3}{4}$ cents, and refined, for which they now ask $76\frac{1}{2}$ cents, could be had then for 43 cents. There has been very little of the crude oil as yet purchased for fall delivery, and the mills do not show much inclination to sell; all of which would indicate a general belief in the present unusually strong position of the market."—"Tropical Life."

BLEACHING OF GINGER.

The following information, extracted from an interesting article contributed by Mr. G. B. Patwardhan, B.Sc., Assistant Economic Botanist, Bombay, to the "Agricultural Journal of India," for July, 1910, is published for general information by the Central Agricultural Committee, Madras:—

2. *Advantages of Curing.*—Green ginger exposed for a few days shrivels by drying and becomes stringy and mostly useless for domestic medicinal use. By curing it, however, its keeping quality is increased, and its transport for sale, &c., is facilitated. The process consists in soaking, then washing the green ginger in lime water, and afterwards fumigating it with sulphur vapour. The time which ginger will keep is thus increased to nearly three years.

3. *Factory.*—The chief requisites for a curing factory are—(1) bleaching-rooms with fittings, (2) washing tanks, (3) lime cisterns, (4) shallow trays made of wicker-work, (5) sulphur powder, and (6) cocoanut-oil.

4. *Bleaching-room*.—This should be 12 ft. by 12 ft. by 12 ft., with three horizontal tiers of shelves arranged at a height of 3 ft. from each other; these are usually made of split bamboos. The shelves support small shallow baskets of 9-in. diameter, placed close to or upon each other. The room is provided with one door, and at one end with a hearth. The latter is a simple niche in the wall of the room, opening from outside, and situated close to the floor. The niche is 2 ft. high, and about as much wide, built in the thickness of the wall, with a portion projecting inside the room. The inner projection holds on it an iron basket which is, consequently, seen only in the room. The basket can be heated from below by igniting a fire in the niche outside. The sulphur, which is placed in the basket, gets heated, and fumes issue which fill the whole air space in the room. The basket gets the direct heat, and no smoke or heat escapes into the room from the hearth. The ceiling of the room is made of split bamboos and plastered with mud and tiled, making it more or less air-proof. The bleaching-rooms in some establishments are often double the length given, with two hearths and one door.

5. *Washing Tanks*.—These are 6 ft. by 6 ft. by 6 ft., built of masonry and lined with cement, and hold the necessary quantity of water.

6. *Lime Cisterns*.—These are of the same dimensions as the washing tanks. One or two spare cisterns are often provided at each place of manufacture.

7. *Curing Operation*.—The green ginger on receipt is first put into the washing tank in water. Two or three men tread the material under foot. The adhering mud is washed off and becomes mixed with the water. During the treading, the outer skin of the ginger is rubbed off. The water is removed and renewed according to necessity.

Next, the cleaned and decorticated ginger is transferred to the lime cistern. This contains lime water of the consistency usually considered sufficient for white-washing walls. Here the ginger remains for some time, during which it is stirred once or twice to effect equal soaking and permeation of lime into it. Afterwards the roots are transferred to small shallow trays. These latter are made of wicker-work and are 9 to 10 in. in diameter. The trays are taken to the bleaching-room and placed on the shelves mentioned above. One room of the standard dimensions holds 300 of these trays, 100 going to each shelf, and each basket taking 5 lb. of green ginger; 7 lb. of powdered sulphur are put on the pan, and fire started from outside. The door is now closed, and remains so for four hours. The ginger absorbs all the fumes produced by the evaporation of the sulphur in the pan. Afterwards, the door is left open for a short time, and then the trays are taken out, and the ginger is spread out in the sun for drying. The fumigating operation is done again the next day, and repeated a third time the day after, the material being dipped in limewater before every fumigation; 8 lb. and 9 lb. of sulphur are used for a second and third bleaching, and the exposure to the fumes inside the room is 12 and 6 hours respectively. The ginger is dried in the sun before each successive fumigation. It is said that, if liming is neglected before the first fumigation, it lowers the quality of the article. Sulphur can be had at a cost of from Rs. 40 to Rs. 45 per maund, and the total cost of bleaching is Rs. 4-8-0 only per candy of 600 lb.

8. *Precautions*.—The fumes of sulphur are poisonous, and choke the breath of persons who inadvertently go into the room after opening it. The doors should be kept open for a few hours after the required interval of fumigation is over, in order to let out the remnant of sulphur vapours into the atmosphere outside. Coolies can get in afterwards to take out the baskets. These men smear their bodies with cocoanut oil to prevent injury to their skin both by sulphur vapour and limewater splatterings.

COFFEE ADVANCING IN DEMAND AND PRICES.

There appears to be considerable interest taken during the last two or three months in coffee cultivation in this State, judging by the demand for the latest publication on "Coffee Culture," issued by the Department of Agriculture and Stock. The reason for this may possibly be found in the following notes on the coffee market published in the November issue of the Ceylon "Tropical Agriculturist." That journal writes:—

"Although our old staple is but a negligible quantity now in the island's exports, only a few hundreds of acres being in cultivation, yet it is of interest to learn of the better times arrived, and in prospect, for the long-tried planters in Brazil, Central America, India, Java, and other coffee-growing countries. Among these are a few well-known ex-Ceylon colonists, who, with rare courage and enterprise, ventured to put capital and 'new blood' into a section of Brazil in the hope of improving cultivation, and especially the preparation of the local coffee. We fear a financial success for a number of years was not achieved; but there may be a fair reward if the latest news from Europe—of an increase of 30 per cent. and more in the price of coffee—is maintained. During August, it seems, strong, active demand and advancing prices were experienced in the London, Havre, Hamburg, and New York markets, for 'good average Santos (as well as coffee generally), and the prices rose from £1 11s. 6d. on 30th June to £2 3s. on 23rd September with free sales. The immediate cause is found in a smaller Brazilian crop now coming forward than came last year; the comparison is between 11 to 12 and 15 million bags, and the crop of 1911-12 will also be a small one—below 12 million bags. But a greater encouragement lies in an increasing demand, due to steadily advancing consumption in Europe and America. Perhaps this may not be welcomed by tea producers; but in a year when there is also a keen demand—and, perhaps, short supplies—of tea, no one need grudge a turn of good fortune for those interested in coffee. But another cause of the rise of Brazil coffee—which, of course, rules the markets of the world—is the great advance of exchange between Rio and London from 15¼ in January to 18¾ in September! No one can be sure of this continuing, or the demand and price being maintained; but, statistically, the position of coffee is expected by good authorities to improve for some months to come, and the world's visible supply is undoubtedly a good deal less than it was a year ago, while 'coffee contracts' have become fashionable in London even outside the usual business circles."

ISOPRENE AND THE GRASS TREE, AND SYNTHETIC RUBBER.

Some time ago it was announced that a certain company had applied for and, we understand, obtained a concession giving permission to work over some thousands of acres of land on the Queensland coast where grass trees abounded. It was understood that the object was to manufacture alcohol. Nothing, so far as we are aware, has since been heard of the project. Now, the "Rubber World" (9th November, 1910), in an article on "Isoprene and Rubber, and the Synthetical Production of Rubber," shows that most of the experiments with this object in view have been conducted on isoprene. What is isoprene? It is a light liquid boiling at about 34 degrees C., which results among other products from the dry distillation of rubber. This suggested the possibility of reversing the change, as isoprene has the same composition (per cent. of carbon and hydrogen) as the parent substance. Attempts have long been made, but Sir William Tilden is to be credited with the first satisfactory observation. Subsequent attempts to repeat the transformation were unavailing for some time, although patents were taken out—e.g., that of Heinemann, who proposed to obtain isoprene by passing certain hydrocarbons through a red-hot tube, and to change it to rubber by the action of hydrochloric acid.

This year, however, Professor Harries, of Kiel, announced that he had succeeded in converting isoprene into rubber by heating it in a sealed tube with glacial acetic acid. The rubber obtained was tested by his now classic methods involving the use of nitrous fumes and especially of ozone.

About the same time Dr. Pickles published a paper confirming the results of Tilden.

The transformation of isoprene into rubber may thus be regarded as demonstrated satisfactorily.

At present isoprene is obtained by the destructive distillation of turpentine, and, as the yield is only 10 per cent., this is out of the question as a starting-point for commercial development. The English patent, 19701 (1909), of R. W. Wallace concerns itself with a new method of producing isoprene, which is seen to be in a sense the nucleus problem of the situation.

The claim is for the production of isoprene by the destructive distillation of various raw materials, especially the bark, &c. of the *Xanthorrhæa* ("black boy") trees of Australia. The distillate is absorbed in a suitable solvent, such as acetic acid, from which the isoprene may be recovered in a more or less pure state.

Another English patent, 15299 (1909), by Wallace and Morton, concerns itself with the formation of rubber from this isoprene. The change is said to proceed with the aid of certain bacilli from natural rubber or latex. A normal time for the conversion is two months! Using a culture medium consisting of a solution containing Lemco, glucose, and common salt, this time is said to be shortened to a few days.

It may be noted that the recent Bayer patent, though on similar lines to the transformation of isoprene, does not claim to produce rubber, but a new substance of similar properties, by heating erythrene (a hydrocarbon).

It will be seen that there are two main problems: Cheap production of isoprene, and cheap and certain conversion into rubber. When this has been effected on a large scale, the technical properties of the product will require study.

In conclusion, it may be mentioned that in an editorial on Harries' discovery the "Gummi Zeitung" admitted its importance, but pointed out that in the case of indigo commercial synthetic production was first possible years after success had been attained in the laboratory.

It is well to remember that it succeeded ultimately.

[It is remarkable that the bark of the *Xanthorrhæa* (our Queensland grass tree) is here especially singled out as producing the best raw material for the production of isoprene. If the company abovementioned had this in view, it is regrettable that the work was not entered upon, as a most valuable and important industry might, eventually, have been established in the State, in the production of synthetic rubber.—Ed. "Q.A.J."]

YIELD OF PARA RUBBER TREES.

In his valuable and interesting papers on the "Science and Practice of Para Rubber Cultivation" now appearing in the "Mindanao Herald" (Philippine Islands), Mr. J. Parkin, M.A., F.L.S., says, in respect to the yield of rubber from plantation trees:—

The rubber-producing capacity of cultivated Heveas has in the past been under-estimated, and even now the full extent to which it may ultimately reach, as the trees mature, cannot be said to have been gauged with any degree of accuracy.

An average of $1\frac{1}{2}$ lb. per annum for a tree 12 years old was the original calculation for Ceylon, but this was before wound-response had been taken into account. In Malaya 6-year-old plantations are now giving 10 oz. to 1 lb. a tree, an amount gradually advancing to 3 lb. as the trees reach an age of 10 years; higher subsequent yields are expected. A few old, well-developed trees have given 12 to 25 lb. each per annum. Eight 17-year-old Heveas in the Perak State, of an average girth of 55 in. have supplied $28\frac{1}{2}$ lb. of dry rubber per tree.

The Cicely Estate, one of the older Malay companies, obtained an average of 6 lb. per tree from 9,000 which were regularly tapped in 1908. The age of these trees varied from about 10 to 5 years, but a third of them were of the latter age, undergoing their first tapping; consequently some of the older trees must have yielded well over 6 lb. of rubber per annum.

From a financial or economic point of view a better method of calculating the yield is by the acre. As the planting distance varies so much, the average per tree is no clear indication of the producing capacity of an estate. It is now generally assumed that an acre of Pará rubber, when it comes first into bearing at the age of 5 or 6 years, will yield 100 lb. of rubber per annum; in the 10th year three or four times this amount at least may be expected. Beyond this there is little data available.

The producing power, for example, of a 20-year-old plantation, which has been regularly tapped, can be merely guesswork at the present time. The future may have unforeseen drawbacks in store, or it may furnish still more agreeable surprises.

The youthfulness of the trees from which the majority of plantation rubber is at present obtained has been blamed for this supposed lack of strength. The tapping of cultivated Heveas is begun when their stems, at a height of 3 ft. from the ground, have attained a girth of about 20 in. They reach this size under favourable conditions of growth in 5 or 6 years from the time of planting. The rubber in the forests of Amazon is collected from much older trees. Then it is an undoubted fact that rubber from quite young trees or twigs of Hevea is very different in elasticity. There has consequently been much opinion expressed to the effect that the latex takes some time to mature, and so naturally it is argued that the rubber from old trees must be better than from young ones. But the botanical fact is lost sight of that new laticiferous elements are continually being added by the cambium to the bast, no matter what age the tree may be. These must take time to mature. Previous to their full development they are not likely to yield an appreciable quantity of latex. Hence, unless the latex alters its character as the tree grows older, there is no reason for thinking it is less mature in a 6 or 10 year old tree than a 15 or 20 year old one; both will have immature laticiferous tubes as well as fully functional ones.

The reason why the latex from young stems and shoots yields an inferior rubber may be associated with the fact that this latex is contained chiefly in the tubes formed in primary growth. These may quite well differ in their contents from those produced in the so-called secondary growth, which is due to the activity of cambium, and by which the tree increases its girth. If there be any truth in this supposition, then this will account for the fact that the rubber from Hevea trees under 4 years old, and especially of Castilloas of a similar age, is midway in strength between that from the shoots and that from older trees. In such young trees the primary laticiferous tubes will still be yielding some latex, which will mingle with that from the secondary tubes, giving an intermediate product. Later, the primary ones will become wholly compressed by the growth in thickness, and cease to give any latex.

RUBBER PROSPECTS IN PAPUA.

Much interest is being aroused in Papua (formerly British New Guinea) by the promise of the new rubber plantations. None of these are in full bearing, but the progress of the trees has been so remarkable that the *Hevea brasiliensis* is expected to be ready for tapping a full year sooner than in Ceylon or the Malay States. It has also been found that various kinds of rubber-bearing plants, which in other countries produce "latex" of small tensile strength and low value, in Papua will yield a good marketable rubber. The best known of the wild rubber trees of Papua, the *Ficus rigo*, is now being largely cultivated. There are a number of wild rubber vines from which the natives procure rubber, said by experts to be actually superior to the best Pará. Everything, in short, seems to point to a remarkable future for Papua as a rubber-producing country.

THE FUTURE PRICE OF RUBBER.

Mr. W. K. S. Saunders, a planter and visiting agent in Ceylon of over twenty years' residence, writing to the "Evening News," gives reasons why rubber should not drop to 5s. per lb. during 1911. Mr. Saunders takes 7s. as the average price during this year, and says:—"Enormous increase in demand is taking place, and is bound to, for motor traction and electricity alone; it is an admitted fact that the trade is living from hand to mouth, and any moment such a demand may spring up as to send prices up to 10s. or 12s. a lb. The late depression in prices in Mincing Lane has, in my opinion, been manipulated."

TOBACCO-GROWING.

For the benefit of many inquirers it is desirable to place the tobacco situation clearly before the farmers of this State. The districts of Texas and Inglewood, so far as our experience goes, are decidedly the best country for growing pipe varieties of tobacco; and the district about Bowen has, so far, proved to be the best for growing the cigar types. It should be borne in mind by prospective growers of tobacco that it is a highly specialised crop, and that, while any district will *grow* it, not all will grow *good* tobacco. It is influenced by infinitesimal causes, and we do not know what they are; consequently, all prospective growers should at first only grow very small areas to determine whether or not the conditions are suitable. All we can tell is, that we want a very friable soil and a humid atmosphere, and the balance we can only learn through experiment.

There is a demand, at fairly remunerative prices, for some 2,250,000 lb. of Queensland pipe tobacco, which we have so far been unable to supply; and, while the increase in quantity is very gradual, the increase in quality and price in the past few years has been very material, and at least good remunerative prices are likely to continue for several years to come. There is plenty of good tobacco land available in the district about Inglewood, either for purchase or for rent. There is a railway to Inglewood.

Of cigar tobacco there is a demand for some 40 to 50 tons, and we hope to increase this demand as we have done for the pipe tobaccos—by improving the character of the output. Seeds of both varieties are to be obtained at the Department of Agriculture and Stock. Tobacco seed should be sown not later than the 10th of December, and transplanting should be finished by the early days of February. Intending growers should state what kind of seed, whether cigar or pipe seed, is required.

R. S. NEVILL, Tobacco Expert.

General Notes.

GRASS TREE GUM.

The yacka, or grass tree, grows and thrives most excellently on Kangaroo Island, and gives forth most abundantly a good marketable gum. The yacka grows from 1 to 10 ft. high, and is from 1 to 2 ft. in diameter. The usual procedure in getting the gum ready for market is as follows:—In the winter cut away all the burnt matter adhering to the yacka—what is termed trimming. Then top them—viz., all the overhanging portion of the tree is cut clean off. This invariably kills the tree. The hard bullocking work then begins. With a good sharp axe cut a swath from the top, right to the bottom, just getting on to the pith or heart of the tree. As the axeman cuts the fibre with the gum adhering to it, it flies into a receptacle which they term a boat. A smart lad is usually engaged for the purpose of carrying the fibre to a heap. When this is done and the heap is sufficiently large enough, it is then put through a jigger, which separates the gum from the fibre. The fibre is then allowed to remain on the ground, as being valueless, whilst the gum is put through a winnowing machine, the finer quality falling through the sieves, and the rougher quality, the most valuable, goes down the spout. It is then bagged, weighed, and branded. To obtain the best prices, the quality has to contain 2 parts of coarse to 1 of fine. Last year it was worth £4 per ton at Stokes Bay, K.I.

It costs £1 7s. 6d. per ton to get ready for the market; bags and the carting have to be added to the expenses. The writer has an interest in a property on Kangaroo Island where the yackas were considered a perfect nuisance, but now, especially if the prices continue, it is a source of revenue, and will help to pay for the clearing of the land, which is a very heavy expenditure. It is pleasing to note that the Government do not intend to grant any more licenses for cutting gum, for the time being. This is a very wise step to take, for the reason that it is manifestly unfair to any new settler going on to a new piece of country if he finds all the gum has been cut on that piece of land which he has purchased.

The gum is used in the manufacture of smokeless powder and varnishes. The bulk of the gum is exported to Germany. There are thousands of tons of gum left on the island, but roads being bad it will take some considerable time before it is shifted. There is a great future before the island in many respects. The climate is perfect; the rainfall is good. The land is as good as any that is on the mainland, notwithstanding what Mr. Verran says to the contrary. The best barley in the world is grown there. After the land has been cleared of scrub, English grasses will grow most luxuriantly and will keep green nearly all the year round; this has been proved beyond doubt by experiments. All kinds of fruit trees will flourish, particularly the apple tree. Potatoes and onions can be grown profitably. It is the home of the bee.—“The Farm.”

A SIMPLE MOUSE TRAP.

The need of a convenient mouse trap is at times apparent, when it is not easy to obtain the article. A young housekeeper in one of our cities, however, has accidentally discovered a substitute for a trap. It is nothing else but the ordinary sticky fly paper, which she places convenient to their haunt, and has not only made several captures, but has evidently frightened away the survivors, who do not seem to understand that sort of device at all.—“Exchange.”

SEEDLESS WATERMELONS.

"The arrival in Chicago of a carload of seedless watermelons marks progress," says an American journal. "By all means let us have more of them. The one great fault of the watermelon has been its excess of seeds, that interferes with the joy of consumption. These watermelons came from New Mexico, and the process of reaching the seedless condition is thus described:—'After the vine has grown for 3 ft. or 4 ft. in length, the end is covered with earth. When this end takes root, it is cut loose from the old root, and the early blooms are pulled. Melons grown from the second blooms are seedless.'"

DEEP SILOS.

A deep silo is much preferable to a shallow one, as more ensilage can be stored in the same number of cubic feet. The pressure is greater, consequently the contents pack more closely. The extra weight of ensilage in a deep silo more thoroughly excludes the air, and for this reason the silage keeps better. If built high, instead of wide, more ensilage will be removed from the surface daily, which will guard against spoiled feed. The deep silo requires less foundation wall, less cement floor space, and less roof, which in some localities and with certain kinds of silo is an advantage. Less help is required in spreading silage in a deep pit. The spoiled silage at the top is less in proportion to the whole amount.

WHERE SNUFF COMES HIGH.

China is the great snuff-taking country of the world (says the "Shield Gazette"), and there is snuff there worth the theoretically fancy price of 1,000,000 dollars per lb., which is handed around at the great banquets. Its high value comes in this way:—The rich Chinamen buy the bulk of their snuff from Portugal, where there are families owning private old-time recipes, who sell the Chinaman keeps it many years, and, the legal rate of interest being 32 per cent. per annum, its theoretical value soon increases. The Chinese carry it in beautiful bottles of porcelain and agate, miracles of art, which are worth as high as 1,000 dollars each.—From "Western Tobacco Journal."

CLOTH FROM BANANA FIBRE.

In the December issue of the journal, we printed an extract from the "Board of Trade Journal," having reference to an exhibit of banana fibre cloth at a recent fair in China. From the following note in the latter journal for 13th October, it will be seen that the wily Mongolian has been palming off a cloth as banana cloth which turns out to be a mixture of ramie and banana fibre. The "Board of Trade Journal" now writes:—With reference to the notice in the "Board of Trade Journal" of 28th July, relative to cloth made in China from banana fibre, the Commercial Intelligence Branch of the Board of Trade are informed by the Colonial Office that, as a result of the examination at the Imperial Institute of a sample of the cloth, the weft only has been found to be composed of the banana fibre, while the warp consists of China grass or ramie fibre.

Answers to Correspondents.

THERMOMETERS.

DAIRYMAN, Atherton—

By using the following formulæ, you can easily reduce the reading of one thermometer to that of another:—

To reduce Centigrade to Fahrenheit—

$$\frac{\text{Cent. degrees} \times 9}{5} + 32 = \text{Fahrenheit.}$$

To reduce Fahrenheit to Centigrade—

$$\frac{\text{Fahr. degrees} - 32 \times 5}{9} = \text{Centigrade.}$$

To reduce Réaumur to Fahrenheit—

$$\frac{\text{Réaumur degrees} \times 9}{4} + 32 = \text{Fahrenheit.}$$

To reduce Fahrenheit to Réaumur—

$$\frac{\text{Fahr. degrees} - 32 \times 4}{9} = \text{Réaumur.}$$

To reduce Centigrade to Réaumur—

$$\frac{\text{Cent. degrees} \times 4}{5} = \text{Réaumur.}$$

To reduce Réaumur to Centigrade—

$$\frac{\text{Réaumur degrees} \times 5}{4} = \text{Centigrade.}$$

Because 9 degrees Fahrenheit = 5 degrees Centigrade = 4 degrees Réaumur.

DODDER—YORKSHIRE HERO PEAS.

D. MACKAY, Kenmore—

Dodder will remain in the ground if you allow it to seed, and any small pieces left behind will continue to grow. When the field has become generally infested, plough up the lucerne before the seed is formed, and sow a non-leguminous crop, which will not be much troubled by the dodder. When buying lucerne seed, a magnifying glass will enable you to detect the presence of impurities. The principal Brisbane seedsmen may be depended upon to sell you dodder-free seed. As for the State control of the sale of lucerne seed, there is no need of any such interference with the seed trade, even if it were practicable. The remedy lies in your own hands. See "Combating Dodder," in this issue.

With regard to what you say about being victimised in the purchase of Yorkshire Hero Peas, you also can avoid fraud by dealing only with seedsmen who have a reputation to maintain. There must be some mistake in the calculations of the farmer who said he lost £100 on a crop of peas owing to being victimised by the seedsman.

Artificial manures may be purchased from E. Rich and Co., Brisbane; Baynes Bros., South Brisbane; and other Brisbane merchants, who will give you the analysis of the manures, and only charge the regular market price.

SCALE ON ROSES—GRAFTING WAX.

"ROSE FANCIER," Sarina, Mackay—

Kerosene emulsion is the most useful and effective insecticide known for destroying sucking insects.

To make grafting wax, take—Beeswax, 1 lb.; turpentine, 1 lb.; burgundy pitch, $\frac{1}{2}$ lb.; mutton suet, $\frac{1}{4}$ lb.

Melt the wax, pitch, and suet together. While still boiling, remove from the fire and stir in the turps. When cool, place in tins.

Kerosene Emulsion: Take 1 pint kerosene, 1 gallon boiling water, and $\frac{1}{2}$ lb. soft soap. First dissolve the soap in boiling water; then add the kerosene, and churn to a creamy liquid.

REMOVAL OF PLANT FOOD FROM THE SOIL.

JNO. HUNGERFORD, Chinchilla—

1. What amount of plant food—viz., nitrogen, phosphoric acid, potash, and lime—is removed per ton per acre from the soil of potatoes, and, if you can give it, other farm crops usually grown?

2. What is the analysis of brigalow ash?

3. Can you give advice as to any specific or treatment that would kill the spores of Irish Blight in seed potatoes?

1. Plant foods removed in *lb. per acre* by the following crops:—

	Nitrogen.	Phosphoric Acid.	Potash.	Lime.
Potatoes (in 1 ton of tubers) ...	8	$3\frac{1}{2}$	13	$0\frac{1}{2}$
Mangolds (in 1 ton of roots) ...	4	$1\frac{1}{2}$	10	$0\frac{3}{4}$
Turnips (in 1 ton of roots) ...	$3\frac{3}{4}$	$1\frac{1}{4}$	$6\frac{1}{2}$	$1\frac{1}{2}$
Meadow hay (in 1 ton) ...	33	8	34	22
Wheat (in 20 bushels of grain) ...	22	10	6	$0\frac{1}{2}$
Corn—				
In 20 bushels of grain ...	19	7	$4\frac{1}{2}$	$0\frac{1}{2}$
In 1 ton stalks and leaves	11	$8\frac{1}{2}$	37	11

2. Brigalow ash, like the ash of gidyea, consists chiefly of lime, containing about $91\frac{1}{2}$ per cent. of lime and 1 per cent. of potash.

3. See "Q.A. Journal," July, 1910.

YIELDS OF CROPS PER ACRE.

DAIRY FARMER, Kingaroy—

The yield of crops per acre depends naturally on many things, such as fertility and depth of soil, drainage, character of seed, amount of cultivation, favourable or unfavourable seasons, &c. Under fair conditions cowpeas should yield from 20 to 25 bushels of seed per acre; Giant Russian Sunflower, 40 to 50 bushels; Japanese millet, 20 to 30 bushels; Early Spanish Peanut, about 30 bushels, the average yield varies greatly in different parts of the same country. In the United States the crop goes from 1,000 to 2,000 lb. per acre. in Barbados a good crop is 2,000 lb., and an exceptional crop 4,000 lb. per acre. See paper on "Peanut Cultivation" in Vol. XIII., December, 1903, and Vol. XXII., June, 1909.

The Markets

PRICES OF FRUIT—TURBOT-STREET MARKETS.

Article.	NOVEMBER.	
	Prices.	
Apples (Tasmanian), Eating, per case	6s. to 7s.	
Apples (Cooking), per case	3s. to 4s.	
Apricots, per quarter-case	3s. to 5s. 6d.	
Bananas (Cavendish), per dozen	4½d. to 6d.	
Bananas (Sugar), per dozen	2d. to 3½d.	
Cherries, per quarter-case	3s. 6d. to 6s.	
Grapes, per lb.	4d. to 8d.	
Lemons (Lisbon), per case	9s. to 11s.	
Mangoes, per case	2s. 6d. to 5s.	
Oranges (Local), per case	6s. to 10s.	
Papaw Apples, per quarter-case	1s. to 2s.	
Passion Fruit, per quarter-case	2s. to 5s.	
Peanuts, per pound	2½d.	
Peaches, per quarter-case	2s. 6d.	
Pears, per quarter-case	3s. to 5s.	
Persimmons, per gin case	...	
Pineapples (Ripley), per dozen	3s. to 4s. 6d.	
Pineapples (Smooth), per dozen	3s. to 5s. 6d.	
Pineapples (Rough), per dozen	2s. to 4s. 6d.	
Plums, per quarter-case	3s. to 5s. 6d.	
Rock melons, per dozen	1s. to 5s.	
Strawberries, per dozen pint boxes	1s. to 2s. 6d.	
Tomatoes, per quarter-case	1s. to 1s. 6d.	
Watermelons	2s. 6d. to 10s.	

SOUTHERN FRUIT MARKET.

Apples (Tasmanian), choice, per case	7s. to 10s.
Apples (Jonathan), per case	14s. to 15s. 6d.
Apples (Cooking), per case	3s. to 4s.
Apricots, per box	10s.
Bananas (S. Queensland), per bunch	5s. 6d. to 8s. 6d.
Bananas (S. Queensland), per case	15s. to 17s. 6d.
Bananas (N. Queensland), per bunch	10s.
Bananas (N. Queensland), per case	10s. to 15s.
Bananas, G.M. (Fiji), per bunch	4s. to 5s.
Bananas, G.M. (Fiji), per case	10s. to 14s.
Cherries, per quarter-case	6s. to 7s.
Cocoanuts, per dozen	2s. to 2s. 6d.
Gooseberries, per half-bushel case	4s. to 6s.
Lemons (Italian), per half-case	7s.
Lemons (Lisbon), per gin case	4s. 6d. to 7s.
Mandarins (Thorney's), choice, per half-case	3s. 6d. to 4s.
Mandarins (Queensland), Emperors, per gin case	6s. to 10s.
Mangoes (Queensland), per packer	5s. to 7s.
Oranges (Q'land), choice, Navels, per bushel case	11s.
Papaw Apples (Queensland), per bushel case	4s. to 5s.
Passion Fruit (choice), per half-case	4s. to 5s.
Peaches, per half-case	5s. to 7s. 6d.
Peanuts, per lb.	5½d.
Pears, per bushel case	12s. 6d. to 15s.
Pineapples (Queensland), Ripley, per case	9s. to 10s.
Pineapples (Queensland), common, per case	9s. to 10s.
Pineapples (Queensland), Queen's, per case	10s.
Plums, per quarter-case	4s. 6d. to 6s.
Rockmelons, per dozen	5s. to 6s.
Tomatoes (Queensland), per quarter-case	4s. to 5s.
Watermelons (Queensland), per dozen	12s. to 18s.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR DECEMBER.

Article.							DECEMBER.	
							Prices.	
Bacon, Pineapple...	...	...	...	...	...	lb.	8d. to 9½d.	
Barley, Malting...	...	...	...	...	...	bush.	1s. 7d. to 2s. 1d.	
Bran...	...	...	...	...	...	ton	£5 2s. 6d.	
Butter, Factory...	...	...	...	...	...	lb.	8d. to 8½d.	
Chaff, Mixed...	...	...	...	...	...	cwt.	3s. to 4s.	
Chaff, Oaten...	...	...	...	...	...	"	4s. to 4s. 6d.	
Chaff (Victorian, dumped)	...	...	...	...	...	ton	£4 15s. to £5 10s.	
Chaff, Lucerne...	...	...	...	...	...	cwt.	2s. to 3s. 3d.	
Chaff, Wheaten...	...	...	...	...	...	"	2s. 6d.	
Cheese...	...	...	...	...	...	lb.	4d. to 5d.	
Flour...	...	...	...	...	...	ton	£8 15s. to £9 5s.	
Hay, Oaten...	...	...	...	...	...	"	£5 15s. to £6	
Hay, Lucerne...	...	...	...	...	...	"	£2 10s. to £2 15s.	
Honey...	...	...	...	...	...	lb.	2d. to 2½d.	
Maize...	...	...	...	...	...	bush.	2s. 4d. to 2s. 6d.	
Oats...	...	...	...	...	...	"	3s. 2d. to 3s. 8d.	
Pollard...	...	...	...	...	...	ton	£5	
Potatoes...	...	...	...	...	...	"	£8 to £13 10s.	
Potatoes, Sweet...	...	...	...	...	...	cwt.	1s. 6d. to 1s. 9d.	
Pumpkins...	...	...	...	...	...	"	3s. to 3s. 9d.	
Wheat, Milling...	...	...	...	...	...	bush.	2s. 6d. to 3s. 4d.	
Onions...	...	...	...	...	...	ton	£7 to £8	
Hams...	...	...	...	...	...	lb.	1s. 1½. to 1s. 1½d.	
Eggs...	...	...	...	...	...	doz.	11d. to 1s. 3d.	
Fowls...	...	...	...	...	...	pair	3s. 3d. to 4s. 9d.	
Geese...	...	...	...	...	...	"	7s. to 8s. 3d.	
Ducks, English...	...	...	...	...	...	"	4s. to 4s. 3d.	
Ducks, Muscovy...	...	...	...	...	...	"	5s. 3d. to 6s.	
Turkeys (Hens)...	...	...	...	...	...	"	8s. to 10s.	
Turkeys (Gobblers)	...	...	...	...	...	"	15s. 6d. to 22s. 6d.	

TOP PRICES, ENOGGERA YARDS, NOVEMBER, 1910.

Animal.							NOVEMBER.	
							Prices.	
Bullocks...	...	...	...	...	...	...	£7 17s. 6d. to £10 5s.	
Ditto (single)...	...	...	...	...	...	...	...	
Cows...	...	...	...	...	...	...	£5 12s. 6d. to £7 10s.	
Ditto (single)...	...	...	...	...	...	...	£10 2s. 6d.	
Merino Wethers...	...	...	...	...	...	...	19s. 9d.	
Crossbred Wethers...	...	...	...	...	...	...	18s. 3d.	
Merino Ewes...	...	...	...	...	...	...	16s. 6d.	
Crossbred Ewes...	...	...	...	...	...	...	16s.	
Lambs...	...	...	...	...	...	...	14s. 3d.	

Times of Sunrise and Sunset at Brisbane, 1911.

DATE.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		PHASES OF THE MOON.
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	4:56	6:45	5:20	6:42	5:40	6:21	5:57	5:47	8 Jan. ☾ First Quarter 4 20 p.m. 15 „ ○ Full Moon 8 26 a.m. 22 „ ☾ Last Quarter 4 21 p.m. 30 „ ● New Moon 7 45 „
2	4:57	6:46	5:21	6:42	5:41	6:20	5:58	5:46	
3	4:58	6:46	5:22	6:41	5:42	6:19	5:58	5:45	
4	4:58	6:46	5:23	6:41	5:42	6:18	5:59	5:44	
5	4:59	6:47	5:24	6:40	5:43	6:17	5:59	5:43	7 Feb. ☾ First Quarter 1 28 a.m. 13 „ ○ Full Moon 8 37 p.m. 21 „ ☾ Last Quarter 1 44 „
6	5:0	6:47	5:24	6:39	5:43	6:16	6:0	5:42	
7	5:1	6:47	5:25	6:39	5:44	6:14	6:0	5:40	
8	5:1	6:47	5:26	6:38	5:44	6:13	6:1	5:39	
9	5:2	6:47	5:26	6:38	5:45	6:12	6:1	5:38	1 Mar. ● New Moon 10 31 a.m. 8 „ ☾ First Quarter 9 1 „ 15 „ ○ Full Moon 9 58 „ 23 „ ☾ Last Quarter 10 26 „ 30 „ ● New Moon 10 38 p.m.
10	5:3	6:47	5:27	6:37	5:46	6:11	6:2	5:37	
11	5:3	6:47	5:28	6:36	5:46	6:10	6:2	5:36	
12	5:4	6:47	5:29	6:35	5:47	6:9	6:3	5:35	
13	5:5	6:47	5:29	6:35	5:47	6:8	6:3	5:34	6 Apr. ☾ First Quarter 3 55 p.m. 14 „ ○ Full Moon 0 37 a.m. 22 „ ☾ Last Quarter 4 36 „ 29 „ ● New Moon 8 25 „
14	5:6	6:47	5:30	6:34	5:48	6:7	6:4	5:33	
15	5:7	6:47	5:31	6:33	5:48	6:6	6:4	5:32	
16	5:7	6:47	5:32	6:32	5:49	6:5	6:5	5:31	
17	5:8	6:47	5:32	6:31	5:50	6:4	6:5	5:30	
18	5:9	6:47	5:33	6:31	5:50	6:3	6:6	5:29	
19	5:10	6:47	5:34	6:30	5:51	6:1	6:7	5:28	
20	5:11	6:47	5:34	6:29	5:51	6:0	6:7	5:27	
21	5:11	6:46	5:35	6:28	5:52	5:59	6:8	5:26	
22	5:12	6:46	5:36	6:27	5:52	5:58	6:8	5:25	
23	5:13	6:46	5:36	6:26	5:53	5:57	6:9	5:24	
24	5:14	6:45	5:37	6:25	5:53	5:56	6:9	5:23	
25	5:15	6:45	5:38	6:24	5:54	5:55	6:10	5:22	
26	5:15	6:45	5:38	6:23	5:54	5:54	6:10	5:21	
27	5:16	6:44	5:39	6:23	5:55	5:53	6:11	5:20	
28	5:17	6:44	5:40	6:22	5:55	5:51	6:11	5:19	
29	5:18	6:44	...	...	5:56	5:50	6:12	5:19	
30	5:19	6:43	...	...	5:56	5:49	6:12	5:18	
31	5:20	6:43	...	...	5:57	5:48	...	...	

Orchard Notes for February.

In order that the series of monthly notes that have appeared for some years past in the "Agricultural Journal" might be rendered of more value to our fruit-growers, Mr. A. H. Benson, late Instructor in Fruit Culture to the Department of Agriculture and Stock, took advantage of the commencement of the new year of 1908 to revise them and bring them up to date. At the same time he somewhat altered the notes, as, instead of making them of a general nature, applicable to the whole of the State, he endeavoured to localise them to a certain extent, as, in my opinion, although the general principles of cultivation, manuring, pruning, treatment of fruit pests, as well as of the handling and marketing of the fruit are applicable to the State as a whole, there are many matters that are of interest to individual parts of the State rather than to the whole State; and, further, notes that are applicable to the Southern part of the State for one month are not always applicable to the North for the same month.

In order to carry out this idea, he divided the State as follows:—

1. The Southern Coast Districts, south of the Tropic of Capricorn;
2. The Tropical Coast Districts;
3. The Southern and Central Tablelands.

This plan has met with such general approval during the past year that the notes will henceforth be published in accordance therewith.

The Southern Coast Districts.

The earlier summer fruits, including grapes, will be pretty well over, but pineapples, mangoes, and bananas are in full fruit. The bulk of the main summer crop of pines ripens during the month, and growers are in consequence kept very busy sending them to both our local markets and canneries, and to the Southern States. The planting of all kinds of tropical fruits can be continued where necessary, though earlier planting of both pines and bananas is to be recommended. Still, if the land is thoroughly prepared—viz., well and deeply worked—they can be planted with safety, and will become well established before winter. The month is usually a wet one, and both tree and weed growth is excessive. If unable to get on the land with horses to keep down weed growth, use the scythe freely in the orchard before weeds seed, as by doing so you will form a good mulch that will tend to prevent the soil washing, and that when ploughed in later will add a considerable quantity of organic matter to the soil, thus tending to improve its mechanical condition, its power of absorbing and retaining moisture, as well as to increase its nitrogen contents.

This is the best month of the year in which to bud mangoes in the Brisbane district. The bark of the stock to be budded must run very freely, and the scion when placed in position must be tied very firmly. The bark of the scion should be slightly thicker than the bark of the stock, so that the material used to tie it keeps it firmly in its place. As soon as the bud is tied ringbark the stock just above the bud, so as to force the sap of the stock into the scion, so that a union will take place quickly.

Where cyaniding of citrus and other trees has not been concluded it may be continued during the month, as fruit treated now will probably keep clean and free from scale insects till gathered. If the trees have been treated with Bordeaux mixture, do not cyanide, as cyaniding should always be done previous to spraying with Bordeaux mixture.

If Maori is showing, spray with the sulphide of soda wash. Look out for Black Brand and also for the Yellow Peach Moth towards the end of the month in the earlier districts. Spraying with Bordeaux mixture is advisable in the case of both of these pests.

Get land ready for strawberry planting, so as to be ready to set out runners next month. Some growers set out plants as early as the end of February, but March is preferable. Citrus and deciduous trees can still be budded during the month. Young trees in nursery should be kept clean and attended to; ties should be cut where necessary, and the young trees trained to a straight single stem.

The Tropical Coast Districts.

As the month is usually a very wet one in this part of the State, very little work can be done in the orchard other than keeping down excessive weed growth by means of a scythe. Where citrus trees are making excessive growth and throwing out large numbers of water-shoots, the latter should be cut away, otherwise they are apt to rob the rest of the tree, and thus injure it considerably. Many of the citrus trees will come into a second blossoming during the month, and this will produce a crop of fruit ripening towards the end of winter and during the following spring. The main crop, where same has set in spring, will be ripening towards the end of the month, but, as a rule, insect life of all kinds is so prevalent at this time of the year that the bulk of the fruit is destroyed. Where there is sound fruit, however, it will pay to look after. If the weather is wet it should be artificially dried before packing, but if there are periods of sunshine, then the fruit can be cut and laid out on boards or slabs in the sun, so that the extra moisture of the skin can be dried out. Care will have to be taken not to sun-scald the fruit or to dry it too much; all that is required is to evaporate the surplus moisture from the skin, so that the fruit will not speck when packed.

Tropical fruits of all sorts can be planted during the month. Budding of mangoes and other fruits can be continued. Bananas must be kept netted, as fly is always bad at this time of year.

Southern and Central Tablelands.

The marketing of later varieties of apples, pears, plums, peaches, and nectarines will occupy the attention of the Stanthorpe growers. The grape harvest will also extend right through the month. Every care should be taken to see that the fruit fly and codling moth are not allowed to spread, although the best work in fighting these pests has to be done during the months of December and January, as on the action then taken, if carried out systematically, the freedom of the later fruits from infestation mainly depends.

Handle the fruit carefully, and see that no fly or codling moth infested fruit leaves the district. The grapes, ripening as they do when this fruit is over in the earlier parts of the State, should be sent not only to Brisbane but to all other parts of the State. For long shipments nothing can beat crates holding six 6-lb. baskets. The fruit should be gathered some hours before packing, and be placed in the sun, so as to become thoroughly dry, and to allow the stems to become wilted, as this causes the fruit to hang on the bunch much better, and consequently to reach its destination in better order.

If parrots and flying foxes are troublesome, organised shooting parties or poisoning with strychnine are the best means of dealing with these pests.

The crop of grapes will be about over in the Roma and other inland districts. Citrus trees, when infested by Red Scale, should be cyanided. The orchard should be kept well cultivated after every rain, and when there is no rain, but water is available for irrigation, if the soil requires it, the trees should get a good soaking, which, if followed by thorough cultivation, will carry the trees on till the fruit is ripe.

Farm and Garden Notes for February.

FIELD.—The land intended for potatoes should now be ready for planting. Plant sound small potatoes, well shot, without cutting them. If large potatoes are cut into setts, there is a risk of their rotting, as the usual wet weather may be expected, with a hot, muggy atmosphere. Weeds will be very troublesome, and for that reason the sowing of lucerne should be deferred till later. Sow lucerne in deep rich soil, thoroughly worked, and deeply ploughed. Cape barley, panicum, Kafir corn, imphee, sorghum, and vetches may be sown, but it is risky to plant maize for a late crop, as early frosts would destroy the ripening grain. For an early winter crop, sow Swede turnips and mangel wurtzels.

KITCHEN GARDEN.—Make preparations for good crops of vegetables for the early winter by ploughing or digging all unoccupied land, supplying well-rotted manure if needed. Chicken guano is also an excellent fertiliser, if prepared as follows:—

Spread a layer of black soil on the ground. Dump the fowl manure on to this, and pound it fine with the back of a spade; add hardwood ashes, so that the compound shall contain—Soil, 3 bushels; fowl manure, 2 bushels; ashes, 1 bushel. Mix thoroughly, and a little before planting moisten the heap with water, or, better still, with urine; cover with old mats, and let it lie till needed.

Most market gardeners will have cabbages and cauliflowers ready for transplanting. Do this during the month. Read the article in the pamphlet on "Market Gardening," issued by this Department, on the growing of cabbages and cauliflowers, in which it is recommended to sow the seed from the middle of January to the middle of March, arranging the time, however, to suit early and late districts. For winter crops, the Drumhead type, of which Flat Dutch and Queensland or Florida Headen are good examples, are the most profitable. The Savoy cabbage does well here. The best cauliflowers to grow are the Large Asiatic, Eclipse, Early Dwarf, and Le Normand. If the aphid appears, spray with tobacco solution.

Sow French beans, butter beans, beet, carrot, turnip, radish, cabbage, cauliflower, cress, peas. Should the weather prove dry after the January rains, give the plants a good soaking with water. Gather all fruit of cucumbers, melons, French and other beans, and tomatoes as they ripen, to ensure the continued production of the vines and plants.

FLOWER GARDEN.—Thin out, and tie up dahlias. Keep the weeds down, and never allow them to seed. Sow hardy annuals. This is the best month for sowing, as you will be able to keep up a succession of bloom during the succeeding months of autumn and winter. To ensure this, sow phlox, pansy, daisy, stocks, aster, nasturtium, hollyhock, candytuft, mignonette, sweet peas, dianthus, carnations, cornflower, summer chrysanthemum, verbenas, petunias, pentstemons, &c. Dianthus, sown now and planted out in March, will bloom during the whole year if the dead stalks and blooms are regularly cut away.

Do not sow flower seeds too deep, as on the depth will depend greatly what results you will have as regards the seed germinating. It is easy to remember that seeds should be covered with fine soil to a depth equal to their own size—for instance, a pea is about one-eighth of an inch in diameter, therefore, cover it with one-eighth of an inch of soil.

An exhaustive Booklet on Flower Gardening for Amateurs, and pamphlets on Market Gardening and Pineapple Culture have been issued by the Department, and may be obtained on application to the Under Secretary.

Agriculture.

ANGORAS AND ALPACAS.

Although there are several thousands of Angora goats in Queensland, we very rarely find any allusion to them in Queensland publications. Why this should be so is only to be explained by the supposition that the rearing of these animals has been principally undertaken by graziers and others who apparently have more connection with New South Wales and Victoria than with Queensland; and hence it is only by chance that we get any information concerning the progress of the industry in our own State. What follows is derived from the "Sydney Mail." That journal, in reviewing the history of the introduction of the Angora into Australia, says:—"It is forty years ago since Pioneer McCullough, of Maryborough, Queensland, subscribed £600 towards the introduction of Cashmere and Angora goats; and now we read that a beautiful buck (Perfection), which brought £4 15s. at the recent Adelaide sale, by Mr. G. H. Martin, exchanged hands at 75 guineas, Mr. Rex Blaxland being the purchaser. In all, about 1,300 goats were yarded for sale; and beside those purchased by Mr. Martin for his Wentworthville property, and 300 purchased by Mr. Rex Blaxland for his Singleton estate, bargains were made by representative buyers from New Zealand, Western Australia, Victoria, and Queensland. A remarkable thing about these goats, from Messrs. Kidman and Kemp's Angora stud, is that they have never yet been confined inside fences, never having seen such a thing until they were driven, by the aid of kangaroo dogs, into the saleyards. Mention of Angoras immediately suggests the name of that grand old pioneer, who died not very long since, Mr. Charles Ledger, and his enterprising importations from South America of alpacas, llamas, and Vicuna sheep. According to that assiduous student and indefatigable recorder of facts of the early days of Australia, Samuel Bennett, the expediency of importing alpacas and similar South American species of the ovine family into this State was first suggested in the year 1844; and in 1850 a meeting was held in Sydney to initiate measures to carry out this project, on which occasion it was proposed to raise the sum of £2,000 for the purpose of obtaining a flock of 400 breeding ewes. On 28th November, 1853, Mr. Charles Ledger, who, for many years, had carried on business enterprises in Peru, landed in Sydney an imported mixed flock of 280 alpacas, llamas, and Vicuna sheep, *ex* Salvadora, from the Chilian port of Caldera, in South America. In obtaining these sheep, Mr. Ledger endured many hardships and privations, traversing in his journeys of collection the countries of Peru and Bolivia and the Argentine Mountains. The number of each sort landed in Sydney were:—46 male and 38 female pure-bred alpacas; 110 female llamas, 27 female llamas crossed in the first generation with alpacas; 11 female llamas of the second generation, between male alpaca and females from the first cross; 5 female llamas of the third generation from male alpaca and females from the second cross; 40 lambs of the first, second, and third crosses; and 4 male and 1 female Vicuna sheep. Pedro Cabreba, who had travelled with Mr. Ledger for seven years, was the overseer. In the month of April, 1859, the Government became possessed of this imported flock of llama and other South American sheep, at a purchase cost of £15,000; and undertook measures for their management on an expenditure of £1,000 per annum. That otherwise exact and interesting book, T. A. Coghlan's 'Wealth and Progress of New South Wales,' makes no mention of any efforts to acclimatise, profitably and productively, Angora, alpaca, llama, and Vicuna breeds of goats and sheep in this State."

DESTRUCTION OF CHARLOCK.

An exchange writes:—"The prevalence of the weed charlock in parts of Tasmania has attracted the attention of the Agricultural Department, and it is considering the question of declaring the plant a noxious weed. With this object a circular has been addressed to the municipal councils, seeking their views on the matter. In most instances councillors did not favour the proposal. It would entail a deal of work with practically little or no result on the part of the local government bodies, who are not enamoured of the manner in which other declared weeds have been allowed to flourish, notably the cape weed. The latest attempt on the part of the authorities to add another plant to the list is not relished in the agricultural districts where it flourishes. It would be setting an impossible task to eradicate charlock in some districts, where this year the crops at an early date were yellow with it.

As far back as 1899 the Queensland Department of Agriculture and Stock seriously considered methods of destroying charlock in wheat fields; and a very voluminous article dealing with the subject, and describing the various sprays for its destruction and the effects of the sprays on wheat and other cereal and root crops, was published in this journal in Vol. V., p. 253, September, 1899. In Vol. XII., May, 1903, we published a short report on the work of the "Strawsoniser," which is worth noting. In Vol. XXI., August, 1908, p. 64, is another instructive note on the subject; as also in Vol. XXIV., April, 1910, which described a conclusive experiment in the destruction of this pest of the wheat field, in which charlock was completely destroyed at a cost of from 12s. to 14s. an acre, although the charlock was exceptionally abundant and near the flowering stage. The charlock trouble in Queensland is, however, not nearly so much in evidence as in Tasmania.

BEET SUGAR IN AMERICA.

The "Louisiana Planter" gives the following interesting account of the establishment of the beet sugar industry in Ohio, U.S.A., showing how it was commenced, cost of production, process of manufacture and of machinery, and the profit accruing to the beet farmer.

This is the more interesting to Australians, as another attempt is being made to establish the industry in a Southern State of the Commonwealth:—

Ohio has a new industry that promises to revolutionise farming in the State, and at the same time enhance the value of farm lands to an appreciable extent.

It is the growing of sugar beets and the manufacture of sugar from the vegetable, the factory having been established at Paulding, Paulding county, and started in operation on 17th October last.

Ten years ago Charles H. Allen sent to Germany, the leading country in beet-raising, and secured a quantity of seed. He distributed them among a few farmers, who experimented successfully in their growing, which has spread until at the present time there are nearly 9,000 acres in Paulding, Lucas, Van Wert, and Mercer Counties under cultivation.

The product was shipped to a factory in Michigan to be worked up into sugar, and within the past year and a-half the idea of a factory for Paulding was conceived by Mr. Allen.

Ground was broken 11th December, 1909, and in practically ten months the factory, which cost 1,000,000 dollars to construct, was in operation.

An average of 800 tons of the raw beets are handled daily by 200 or more men and the ponderous machinery, turning into the finished product about 200,000 lb.

Cost of Production.

The cost of production is 30 dollars per acre, and the revenue averages 80 dollars an acre, 12 to 22 tons being realised from an acre, which brings from 4.50 dollars to 6.00 dollars a ton. A graduating scale is used, and the farmer paid according to the amount of syrup secured from the crop. From 6,000 to 8,000 lb. of sugar is obtained from 1 acre of beets, 1 ton of beets producing an average of 240 lb. of sugar.

Six bins, each of 2,500 tons capacity, receive the beets as they are dumped from the waggons, and from the bins pass into the factory through flumes. From the flumes they are carried into the massive washing machinery and thence into an automatic weigher, which weighs $\frac{1}{2}$ -ton at one time, and then dumps them into the cutters. Like huge noodles, known as "cosette," they emerge from the cutting machines on to travellers, which convey them to a myriad of batteries, which extract but 15 per cent. of the juice.

Each battery is equipped with a thermometer that indicates the temperature of the pure boiling water that is poured into the batteries on to the "cosette." Eighteen hours are required for this process alone. The driers remove the other 85 per cent. after the pulp is taken from the batteries.

The juice all extracted, it is run into tanks of carbonic acid gas and lime-juice for the purpose of removing any impurities. A process of removing the limejuice and gas is then gone through, the syrup being boiled successfully in a number of tanks four different times, the water passing off into steam the last time through. Immense presses are next used to force the syrup through a canvas of fine weave, 10,000 dollars' worth of which is used during a season.

Must be Pure.

Steam vacuum pans receive the syrup, which must be 98 per cent. pure to granulate, after it has gone through centrifugals revolving at the rate of 1,200 times to the minute, that turns the sugar from brown to white (the same principle as pulling taffy by hand). A small amount of blueing is sprayed into the centrifugals, to further whiten the sugar before it is sent on to the granulators.

Carriers convey it to the packing-room to be placed into barrels and sacks automatically, with the aid of one man at each machine.

Seventeen artesian wells supply the 2,000,000 gallons of water used daily, a pump of 2,200 cubic feet per minute capacity being in operation constantly during the season, which ordinarily last 100 days, but this season will require at least two months longer on account of the immense crop. Not a stop is made day or night during the season.

Thirty thousand tons of beets have been handled since the factory started on 17th October, and by the close of the season it is predicted that nearly 100,000 tons will be worked up into sugar. That represents approximately over 20,000,000 lb. of sugar.

The dry pulp is sold for 18 dollars per ton and shipped east for dairy purposes, the demand being greater than the supply. Water multiplies this pulp eight times.

Eight boilers of a combined horse-power of 3,200 consume 120 tons of coal and 20 tons of coke daily; 40 tons of limestone are used daily in the manufacture of lime.

The crops are planted in May, and until harvest time require little attention, except blocking and thinning, which is done by foreign labourers from the large cities.

The foreigners and families live in small houses on wheels that can be moved to any part of the farm as the work demands. The houses are furnished by the sugar company at a small cost, the labourer receiving 18 dollars per acre from the farmer for his work.—"Columbus Dispatch," 13th November, 1910.

[To reduce American dollars to £ sterling, divide by 5.]

CROPS FOR SILAGE.

The number of crops available in this State and, to a greater or less degree, suitable for ensilage is so large that it would really be much easier to enumerate those which are not suitable as those that are. Gramineous, leguminous, and cereal plants stand in the front rank, and it would be a difficult matter to mention a variety of either which has not been ensiled. Besides general crops of such a nature, there are what may be called "waste substances," such as beet leaves, sweet potato and turnip tops, potato haulms, thistles; weeds such as fat hen, pig-weed, besides a host of others; potatoes themselves have even been successfully, although only accidentally, turned into excellent silage. Still, it is a truism that the value of the silage is in direct proportion to the value of the crop from which it is made. The value of green maize, for instance, will exceed that of thistles or many grasses just as much when made into silage as when in their green state. This is probably overlooked or not even thought of by those who begin to feed with silage made when crops are not too plentiful; and amongst the silage feeders some appear to have an idea that silage is a generic name for a certain food, the nutritive quality of which is practically the same in all cases. Such a notion has only to be stated for its absurdity to be apparent; but it by no means follows that only valuable crops are suitable for silage. On the contrary, one of its foremost advantages is that it affords a means of utilising substances which would in no other way be available as food for stock. In one sense it may be said that the virtues of the ensilage system are thus most strikingly displayed. In dealing with grasses, lucerne, clover, maize, or other farm crops, their value is obviously not increased—indeed, to some extent, it is necessarily decreased—when made into silage. They are preserved and stored in a useful and economical form, but it would be ridiculous to say that they are improved as food. *Nothing can equal the fresh-cut or grazed crop as fodder for stock.* But, on the other hand, in the case of some of the weeds we have mentioned their feeding value is undoubtedly increased when ensiled, if not by the actual formation of food constituents, at any rate, by rendering them soluble and digestible for stock.

So long ago as 1885, it was remarked, in a return on ensilage made by the Agricultural Department of the Privy Council (England), that—"Meadow grass, clover, trifolium, and aftermath appear to have been generally preferred for ensilage crops, but coarse herbage of all kinds, however uneatable it would be if made into hay, has been used to form ensilage. Oats, green barley, wheat, maize, buckwheat, sainfoin, rye, and other artificial grasses, vetches, lucerne, hop bine, mangold and turnip tops, peas, and beans, with mowings of rough grass from plantations and orchards, hedge sides, and ditches, together with nettles, sedges, and rushes, have all been more or less successfully made into ensilage, and in that palatable form have been taken eagerly by stock."

To the grasses and clovers it is scarcely necessary to refer beyond the remark that they are eminently suitable for silage, and that it is only the fault of the making if they fail in any case to make admirable fodder. They should be cut for silage at about the same stage as for hay. It is a common fault with hay-makers, as with silage-makers, to let both grass and clover get over-ripe. For aftermath or second crops ensilage is very valuable. By its means that which is frequently no better than useless rubbish may, as silage, be made into a valuable and palatable food.

According to Mr. George Fry, a crop for silage should not, when ensiled, contain more than 75 per cent. of moisture, and he recommends leaving it to wither, if necessary, after cutting, if it exceeds this degree of wetness. This is, no doubt, a very necessary precaution for the proper making of sweet

ensilage in a silo. As has been before mentioned, it is a matter of some difficulty to obtain all the requisite conditions in a silo for sweet silage. With a stack, however, the difficulties are much less, and, as a general rule, the silage-maker will be perfectly safe in stacking the crop as it is cut. At the same time it would be absurd to say that it is preferable to cut and make silage during heavy rain. Not only will the labour of carting be greatly increased by the superabundance of moisture, but no doubt there will be some risk of not making so satisfactory a sample of silage as under more favourable circumstances. It comes practically to this:—In an abnormally wet season, such, for instance, as we have lately had in Queensland, no notice need be taken of the weather, and a large quantity of silage may be obtained without any sunshine whatever; but in an ordinary season the farmer will be wise who takes reasonable advantage of fair weather for cutting and making his silage.

Foremost amongst special crops for silage must be placed maize, the king of Queensland farm crops. Green maize is, without question, the crop which is at the same time best suited by its composition for preservation by ensilage and the least capable of being usefully preserved in any other manner. the practical advantages of maize are, the enormous bulk of valuable succulent food per acre which it yields, the fact that successive crops can be taken during the year and that it is cleaning the land, and the ease with which it can be cultivated. It only requires from 4 to 5 acres of maize to fill a 150 or 200 ton silo.

Professor Long tabulates, from investigations made by M. Lecouteux, the following interesting figures:—

	Crop per Hectare (2·472 Acres).	PER TON OF FORAGE.		PER HECTARE OF FORAGE.		Relative Value.
		Nitro- genous.	Non-Nitro- genous.	Nitro- genous.	Non-Nitro- genous.	
	Tons.	Lb.	Lb.	Cwt.	Ts. cts.	
Green maize	80	27	254	19	9 0	9·41
Potatoes	15	47	470	6	3 3	9·95
Swedes	15	29	216	4	1 9	7·38
Vetches	20	79	155	14	1 8	1·97
Cabbages	40	56	198	20	3 10	3·52
Oats—grain	2½	270	1,388	...	...	...
Oats—straw	4	79	814	9	3 0	6·34
<i>Trifolium incarnatum</i>	15	61	180	8	1 4	2·96
Clover	20	79	180	14	1 12	2·28

Sorghum and the various millets are very valuable for silage. So also are the cereals oats, barley, rye, rice, &c. It should be noted that whilst the latter may be ensiled in their most succulent state, provided they are just in ear, the quantity of moisture contained in maize makes it advisable that it should not be placed in the silo or stack until the cob is just in the dough stage.

A W. C. G. Johnson, an English farmer, says that the most notable and valuable crop for silage is a mixture of cereal and pulse crop. He describes how he made 12 tons of first-rate sweet ensilage from 1 acre of tares. In the following year he mixed tares with oats, beans, and peas, which made splendid ensilage on which all classes of stock fed remarkably well, including the farm horses, the latter getting no corn. Lucerne is preferably made into hay, and can only be recommended being made into silage during wet weather, or about the last cutting, which cannot be conveniently made into hay.

WINTER CEREAL REPORT FOR 1910.—STATE FARM, ROMA, BUNGEWORGORAI.

Meteorological.

The weather conditions which prevailed during the season were not conducive to heavy yields, as the results will show.

In the first place, the seeding of the main portion of the experiments, which was accomplished in May, was carried out under dry conditions, which were not dispelled until June, resulting in the crop being fully three weeks late in germinating; secondly, in August and September, when the bulk of the crop was in ear or flowering, a critical period, another dry spell was experienced. This was again followed by moist muggy conditions bringing about a visitation of rust; and, finally, a heavy wind storm accompanied by hail was experienced in the first week in October. These conditions, as before stated, did not permit of any heavy yields being recorded, but were of service in further determining the most suitable varieties of those we are growing for these parts.

The rains experienced, which greatly delayed harvesting operations, also reduced the quality of grain, by promoting germination and bleaching. This was noticeable with some varieties more than others.

Germination.

The English wheats, which were sown under very favourable conditions, appeared in 4 days. Varieties sown in May in soil sufficiently moist to promote germination appeared in from 7 to 8 days.

The main portion of the crops, which were drilled in dry in May, did not receive sufficient moisture until the first week in June, when rain of a soaking nature was experienced. Germination was remarkably slow, the first plants not appearing until the 12th day, and kept coming through until the 16th. This feature was noticeable throughout the district, and more than one instance occurred where seed was ordered for purpose of resowing, owing to the supposition being formed that the vitality of grain in ground had been lost.

The soft wheats appeared from 2 to 3 days earlier than the Durum (hard) varieties.

No better evidences of the beneficial results accruing from early sowing have been met with than those of this season. In many of the blocks, where trees were removed when clearing, the soil was loose and moist, and again in one or two instances the soil had retained the moisture naturally; here the seed germinated immediately, and the ears were fully as long again, better filled than those over the major portion, and ripened 3 weeks earlier, notwithstanding that only the same surface moisture was received. There is no doubt that the extra cultivation had a great deal to do with the extra size of the ears, but the early ripening prevented the rust from injuring it to any great extent, which was in many instances the case with the remaining plants in the block.

Series A.

Owing to the major portion of the block devoted to these experiments having become infested with weeds, only four out of the twenty were sown; two being devoted to 4-inch cultivation experiments, one a rotation crop block, and the bare fallow block, which, besides being a check block in this series, is also used as a comparison block in connection with Professor Campbell's dry-soil experiment.

Unfortunately, these blocks were situated on that portion of the paddock which was nearest the centre of the hailstorm, and were practically chopped to pieces, being rendered wholly unfit for grain and of very little use for hay.

Series B.**Scientific Soil Culture (Professor Campbell's Method).**

Paddock B.—Block, 2·4 acres. In preparing seed-bed, the following operations were carried on, viz.:—3 ploughings, 3 double discings, 6 harrowings.

This land had not been cropped with wheat for 18 months; when sown, a crop of maize grown for silage purposes occupied the ground for 4 months, but this was removed 12 months previous to wheat being put in.

Variety used in test with results, &c., as follows:—Bunge No. 1; sown, 13th May; germinated, 13th June; earing, 1st week September; harvested, 29th October; yield, 12·9 bushels to the acre. The crop was very even, short, about 2 ft. 6 in. in height, stooled very poorly. A good deal of this was lost owing to hail chiefly, very little being knocked down by the wind.

That this class of soil does not respond to the method advocated has been again demonstrated this season. Naturally it is consolidated by the rain sufficiently, but when the teams pass over it two or three times with harrows when moist it becomes more so. It is not only the packer which does not compensate for outlay in labour and horseflesh, but I regret to have to state also the harrows, as the soil, which is of a clayey nature, runs so together as to become tenacious, which means, if harrowed when moist, just the track of the harrow tooth is left, and, if the operation is not carried out until it is dry, less benefit, if possible, is received, as a solid crust has formed. In order to overcome this, it will be necessary to obtain heavier harrows than those at present in use here. In time no doubt the texture of the soil will be so much improved by the humus being continually ploughed in that it will respond more readily to generous treatment.

On the whole, it is thought that this method is more applicable to ashy soils, which are always loose, or those which expand to a great degree when saturated with moisture, than to those which become set like cement after being wet. By this it is not meant to discourage harrowing of crops on this class of soil, as this is the first season that such poor results have been obtained in making surface mulch, and this only occurred when harrowed the second time after an exceedingly heavy downpour, the first harrowing having resulted in a good mulch being obtained, which no doubt resulted in the quick absorption of a good deal of the fall which did the damage. Again, it is quite possible that, though very little good appeared to the eye to have been done, such might not have been the case.

Block 3.—Area, 5 acres. This block last season was included in C.O.S. block, but, owing to formation of numerous small gullies due to slope, it was not considered that a fair test would be given to the system if again included.

The cultivation received before and after sowing was similar to that given the C.O.S. block, with the exception that the sub-surface packer was not used.

The block was cropped in the previous season, and yielded a return of 23·4 bushels to the acre.

The variety sown, yield, &c., were as follows:—J. Brown; sown, 25th April; germinated, 2nd week June; earing, 3rd week September; harvested, 11th November; yield, 11·35 bushels to acre. Crop much shorter than last year, straw fairly clean, heads fairly well filled, stooled poorly, practically uninjured by storm.

Series C.

Area of blocks, $\frac{1}{4}$ acre. In this series the work carried out consisted of the further testing of those wheats received from Garton's in 1908 and Messrs. King and Sons, Essex, England, last year.

As the behaviour of the respective varieties last season demonstrated they were long-season wheats, they were sown in the latter end of March fully a month earlier than in the previous. Notwithstanding this, they did not ripen

any earlier, nor was the growth in advance at any period of that attained at same time in the previous season; and the yields, if anything, are slightly lower.

When the first May sown crops of the local varieties were commencing to ripen off, the earlier and most forward of these were only as many inches as the others were feet in height, and gave no sign of coming into shot blade.

At maturity the straw was short in all instances. Rust was present more or less in all the blocks; grain, soft and inclined to be weevily.

On the whole, these wheats are magnificent tillerers, resembling Manitoba in this respect and many other respects as to growth, and are, like this variety, more adapted for cooler climates. The following are the varieties sown, with yields:—

Variety.	Yields per Acre—Bushels.		Remarks.
Ceres	...	3.9	Very poor, rusty, not worth further trial.
A Dattell	...	11.8	Worthy further trial, straw inclined to be weak.
Emperor White	...	6.0	Poor, not worth troubling about.
Imp. Sq. Head	...	5.7	Poor, not worth troubling about, rusty.
Jubilee Champion...	...	3.7	Poor, not worth troubling about, very rusty.
Red X.	...	5.4	Poor, not worth troubling about, very rusty.
Rent Payer	...	4.8	Very poor, rusty, not worth keeping.
✓ Rivett's Red	...	11.2	This wheat worthy further trial, afraid beard would preclude being grown to any extent.
Sq. Head Master	...	4.0	Not worth further trial.
Stand Up	...	3.5	Very poor growth 1 ft high, not worthy further trial.
White Champion	...	3.5	Very poor growth, 1 ft. high, not worthy further trial. Stand up.

These were obtained from King and Sons.

The two following varieties which have done better this season were obtained from Garton Bros. in 1908:—

Variety.	Yields per Acre—Bushels.		Remarks.
New Era	...	10.8	Unsuitable owing to heavy coarse awns, very prolific stooler, rusty, grain pinched.
Red King	...	9.8	Worthy of further trial.

The first crop in this series was not ready for harvesting until 3rd week in November, having occupied the ground nearly 3 months longer than the earliest local varieties.

The soil in these blocks is very even in quality, and is considered to be as good as any devoted to wheat culture on the farm.

Series D.

As in last season, this series has been devoted to the further testing of varieties on a larger scale whose yields in the last and previous years were above the average. Preparation of seed-bed necessitated 2 ploughings, 1 double discing, and 3 harrowings; seed drilled in at rate of $\frac{1}{2}$ -bushel to acre; and harrowed crops harrowed twice during growth.

Next year it has been suggested by the Agricultural Chemist that these blocks be manured in order to ascertain the effects of such on the different varieties, as our manurial experiments at present only deal with the results obtained by using different fertilisers on one variety of wheat.

Though it will mean a considerable amount of extra work if it should materialise, there is no doubt that it will make this class of experiment more complete.

The varieties tested, with yields, &c., are as follows:—

DURUM.

Of this class the variety grown most successfully during the previous years proved to be Cretan, and was the only one sown this season.

The trouble with most of this class is the presence of awns. These not only prove troublesome when winnowing, but, owing to the room taken up by them in the stripper, necessitate double the number of trips into winnower to unload for same quantity of grain as obtained from a bald variety.

In addition to this, some varieties, like Velvet Don, are exceedingly hard to thresh, and this, in conjunction with the other, proves severe on horseflesh.

Variety, Cretan; area, 1 acre; sown, 29th April; germinated, June; earing, last week September; harvested, 15th November; yield, 8.1. Poor yield due to dry weather and hail, 25 per cent. of the crop being cut down by the latter. A little rust was present on the foliage on the outer edges of block where crop was inclined to be rank, but the crop, as a whole, was the most rust free on the place.

As has always been noted in connection with this class of wheat during a dry spell, their green healthy appearance was a feature of this crop this season, but, as before noted, such is due to the natural deeper green colour of the foliage, and not on account of their better ability to withstand droughty conditions. In verifying this statement it may be stated that, whereas this wheat upon emerging from the shot blades the ears were found to be one-third tipped, Hermitage growing alongside, which, owing to the bluish white tinge of foliage, appeared to be suffering acutely, had hardly any visible and yielded half as much again of grain.

BREAD WHEATS.

Area blocks; 1 acre. Hermitage No. 2; sown, 29th April; germinated, June; earing, 1st week September; harvested, 1st November; yield, 12.4 bushels; grain, pinched. This crop, as before stated, compared very unfavourably in appearance with Cretan during the dry spell. The latter also experienced a shower, which benefited it slightly, this crop being too ripe at the time.

J.C. 157; sown, 29th April; germinated, June; earing, 3rd week September; harvested, 13th November; yield, 12.4; grain, very pinched, due to rust. This variety was sown on account of the showing made by it in the previous season, when it yielded 23.4 bushels to the acre. It is rather slow in growth, very flaggy, rusty (had it not been for the dry spell, this crop would probably have been a complete failure from this cause), head clubbed, medium short stout straw, head does not get well away from shot blade; foliage, coarse dark-green in colour. The yield was very little, if at all, reduced by storm. A smaller area of this will be sown next season.

Moulds; sown, 29th April; germinated, June; earing, 1st week September; harvested, 1st November; yield, 10.5; grain, pinched; yield considerably reduced by storm. The average yield of this variety for the five years grown is over 13 bushels to the acre.

Sussex; sown, 30th April; germinated, June; earing, 3rd week September; harvested, 17th November; 8.5 bushels; grain, very pinched, due to rust and dry weather causing it to ripen off prematurely; suffered very little from storm; a little late in maturing, probably, for these parts.

Crossbred 353; sown, 30th April; germinated, 9th May; earing, 3rd week August; harvested, 28th October; yield, 13'4. The soil in this block was sufficiently moist to promote germination, and to this can be attributed the better yield. Had not such been the case, in all probability this would have been a very poor crop, as rust destroyed any late portions in it. This was one of the earliest and worst rust-infested crops on the farm.

Crossbred 349; sown, 30th April; germinated, 9th May; earing, 3rd week August; harvested, 27th October; yield, 15'4. The soil in this block was in the same condition as that of the previous block when sown. The crop was infested with rust, but not to such an extent as 353. Both crops were blown about by wind, but practically no hail fell here.

Yandilla King; area, 2 acres; sown, 30th April; germinated, 9th May; earing, 2nd week September; harvested, 1st November; yield, 16'8 bushels to the acre; grain, probably one of the best samples obtained this year. The success met with was wholly due to the soil being sufficiently moist to promote germination when seeding, as a later-sown block was practically a failure from rust and dry weather. It is a slower maturing wheat than the two previous, being a mid-season variety, which means that it must germinate in May to be successful. On this account it cannot be recommended from this season's results for general sowing, which is a pity, as it is a good yielder, though long in the straw, stands up well, having a strong stout straw, fairly good rust-resister when up early, and has a grain of pleasing appearance. For the 3 years grown, this variety has given an average yield of 20'2 bushels to the acre.

Series E.

MANURIAL EXPERIMENTS.

This is a new departure, and has afforded very interesting results, as will be noticed particularly in the heavier soil experiments, where an instance occurs of one manure giving a return of 4 bushels to the acre more than those on either side, for an outlay of 5s. 6d.

The whole of the work as to the selection of manures and methods of applying was formulated by the Agricultural Chemist, which means that the work is on a scientific basis, without the commercial aspect being lost.

The experiments have been carried out on two classes of soils, to make them as far-reaching as possible; the classes treated being raw sand and loamy soil, the latter being situated on what is considered the best soil in the wheat paddock, so, probably, had not our work permitted of their being carried out elsewhere, the difference in yields might have been greater still.

It is to be regretted that so much havoc was wrought in these blocks by the storm experienced, as it reduced the yields in all instances, though some more than others—a fact which in itself may be of value in proving that the effect of the fertilisers in these blocks is such as to strengthen the structural part of the plant, and so enable it to withstand better such conditions.

(TO BE CONTINUED.)

DESTROYING HIBERNATING INSECTS.

An English paper suggests per-chloride of mercury for insects hibernating in the ground. A solution of 1 in 2400 will kill all the worms in the ground, but has no effect on grass. It is used constantly on golf greens, and the cost of the material is only 2s. 9d. per lb.; 1 lb., made up into 240 gallons of solution, is sufficient to saturate the ground round about 100 trees. If this would destroy the larvæ of the fruit fly, it would be a cheap remedy.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

RECORD OF COWS FOR MONTH OF DECEMBER, 1910.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Average Test Per cent.	Commercial Butter.	Remarks.
			Lb.		Lb.	
Lass ...	Ayrshire ...	5 Nov., 1910	1,159	3.9	50.43	
Mona ...	Grade Holstein ...	14 Aug. "	1,089	4.0	48.67	
College Lass ...	Ayrshire ...	22 Aug. "	952	4.4	47.02	
Hettie ...	Grade Guernsey ...	15 Oct. "	947	4.3	45.66	
Glen ...	Shorthorn ...	21 July "	880	4.6	45.54	
Auntie ...	Ayrshire ...	8 Aug. "	865	4.4	42.72	
Nellie II. ...	Shorthorn ...	20 Nov. "	1,084	3.5	42.11	
Reamie ...	Ayrshire ...	7 Nov. "	939	4.0	41.57	
Honeycomb ...	Shorthorn ...	25 June "	825	4.4	40.74	
Lady Kelso ...	" ...	27 Nov. "	1,042	3.5	40.44	
Dewdrop ...	Holstein ...	15 Nov. "	1,053	3.4	39.53	
Orange ...	Grade Guernsey ...	6 Dec. "	828	4.1	37.97	
Conceit ...	Ayrshire ...	18 Nov. "	915	3.6	37.24	
Lavina's Pride ...	" ...	13 Oct. "	831	4.0	37.14	
Rhoda ...	Grade Guernsey ...	9 Nov. "	895	3.8	36.90	
Nancy ...	Shorthorn ...	10 Aug. "	852	3.8	36.07	
Lady Moreton ...	" ...	21 Nov. "	981	3.3	35.73	
Remit ...	Grade Holstein ...	8 July "	799	4.0	35.71	
No. 112 ...	Grade Guernsey ...	24 Oct. "	794	4.0	35.33	
Night ...	Grade Holstein ...	11 Nov. "	833	3.8	35.27	
Patch ...	Shorthorn ...	16 Nov. "	1,007	3.1	34.34	
Helen ...	Ayrshire ...	20 Oct. "	910	3.4	34.25	
Cuckoo ...	Jersey ...	8 July "	621	4.8	33.60	
Butter ...	Shorthorn ...	14 Aug. "	814	3.7	33.51	
Lady Sue ...	Grade Holstein ...	4 April "	787	3.8	33.31	First calf
Lady Lock ...	Ayrshire ...	4 Dec. "	792	3.7	32.60	
Eve ...	Jersey ...	1 Nov. "	589	4.8	31.85	
Peewee ...	Grade Holstein ...	22 Aug. "	824	3.4	31.01	
Miss Ere ...	Dexter Kerry ...	12 Oct. "	611	4.3	29.24	
Lemonade ...	Grade Guernsey ...	25 May "	547	4.7	28.95	First calf
Norma ...	Shorthorn ...	15 July "	608	4.2	28.60	First calf
Lydia ...	Ayrshire ...	8 Sept. "	630	4.0	28.16	

Natural grass paddocks only.

FARMERS' PIGS.

Notwithstanding the great improvement noticeable in the housing of pigs amongst progressive farmers, there are still many small farms on which the old style of log or slab pigsty, wet and filthy, is still considered good enough for these naturally cleanly animals. As far as much-needed little grass run for them, it is not even thought of in such cases. Not long ago we saw half a dozen Berkshire pigs, in the Broadwater district, crammed into such a dirty sty, out of which they never emerged until they were killed and carted to town as "farm-fed" pork. This farm-feeding consisted entirely of waste food—garbage from the South Brisbane hotels and boarding-houses. In another case we saw 30 or 40 pigs ready for market herded together in—well, not quite so bad a sty as that mentioned—in a Chinaman's garden only 6 miles from Brisbane. These certainly got vegetable food, but the main part of the food consisted of waste from hotels, boarding-houses, and vegetable shops, with an admixture of damaged butcher's meat.

It is now generally accepted by pig-keepers that pigs should have exercise. To eat, and then to sleep, and to only rouse up to eat again, is admitted to

be bad for pigs in the long run. Just on killing time, when the pig is laying on the last few potatoes and bags of pollard, it may as well have sleeping all its own way, so long as it comes to the trough heartily. But if the owner only knew that nearly all the ills that pigs' flesh is heir to come by want of suitable exercise, he would be the last to keep his little pigs shut up continually. Quite a small enclosure, even if it be only a shed with a heap of fresh straw, may be made to serve in bad weather. On fine days, however, the little pigs should be allowed to run out. What they require is a run and a scamper. This will strengthen their limbs and encourage them to perform the functions that relieve Nature. They will then return to the trough with hearty appetites and renewed vigour. One of the best kinds of pigyards is one that filled the place between a double row of sties that faced each other. The court was completed by a fence across each end, and had lean-to roofs, sloping inward, attached to the end fences right across. The place was drained, and the yard was always perfectly dry, except, of course, when it was actually raining. Being floored with cement laid on a slope, it dried directly. Under each covered lean-to was kept a heap or two of clean litter. Each heap was shaken up daily, and a potato or two were thrown in it. Sows and little pigs both revelled in these heaps when let out for exercise.

IMPORTED STOCK.

In this issue we give a first instalment of illustrations and pedigrees of the purebred stock, lately brought from the old country, in the s.s. "Dorset," by Mr. John Mahon, Principal of the Queensland Agricultural College, who was deputed by the Department of Agriculture to procure some first-class dairy cattle and horses for the College, the State Farms, &c. Mr. Mahon has carried out his instructions exceedingly well, and there is probably no stock in Australia which are superior to those due to his knowledge and experience in the matter of live stock. He was somewhat handicapped in buying, as he had just been preceded by continental and other buyers to whom money was no object. Notwithstanding this, he has been eminently successful, and all judges who have seen the animals are unanimous in their approval. In our March issue we shall give further particulars and photographs of the rest of the imported animals:—

Arness Supreme has been shown twice and has been awarded first on both occasions.

Pedigree of Arness Supreme.

Sire—Arness Bibby; register number, 6498.

Sire of Sire—Barcheskie Red Prince; register number, 6002.

Dam of Sire—Arness Brownie; register number, App. Vol. 30, p. 626.

Dam—Arness Bidy; register number, App. Vol. 31, p. 683.

Sire of Dam—Arness Star; register number, 6497.

Dam of Dam—Bella; register number, ———

Pedigree of Two-year-old Ayrshire Heifer, Windyhill Davidina.

Bred by James Dunlop, Midlands, Fenwick.

Sire—Mill of Shield Prince Galla (5389); g sire—Prince Emerald of Netherhall (4228).

Dam—Midland Davidina (Vol. 30, page 696), by Montgomerie of Walston (309).

Prince Galla won numerous prizes, including the Herd-book Society's medal; while his dam, still living and now the property of James Howie, of Hillhouse, has a record for two seasons of upwards of 1,000 gallons.

Windyhill Davidina was considered to be the best Ayrshire heifer in Scotland. Mr. Clements paid 80 guineas for her at auction when a calf.



AYRSHIRE BULL—ARNESS SUPREME.



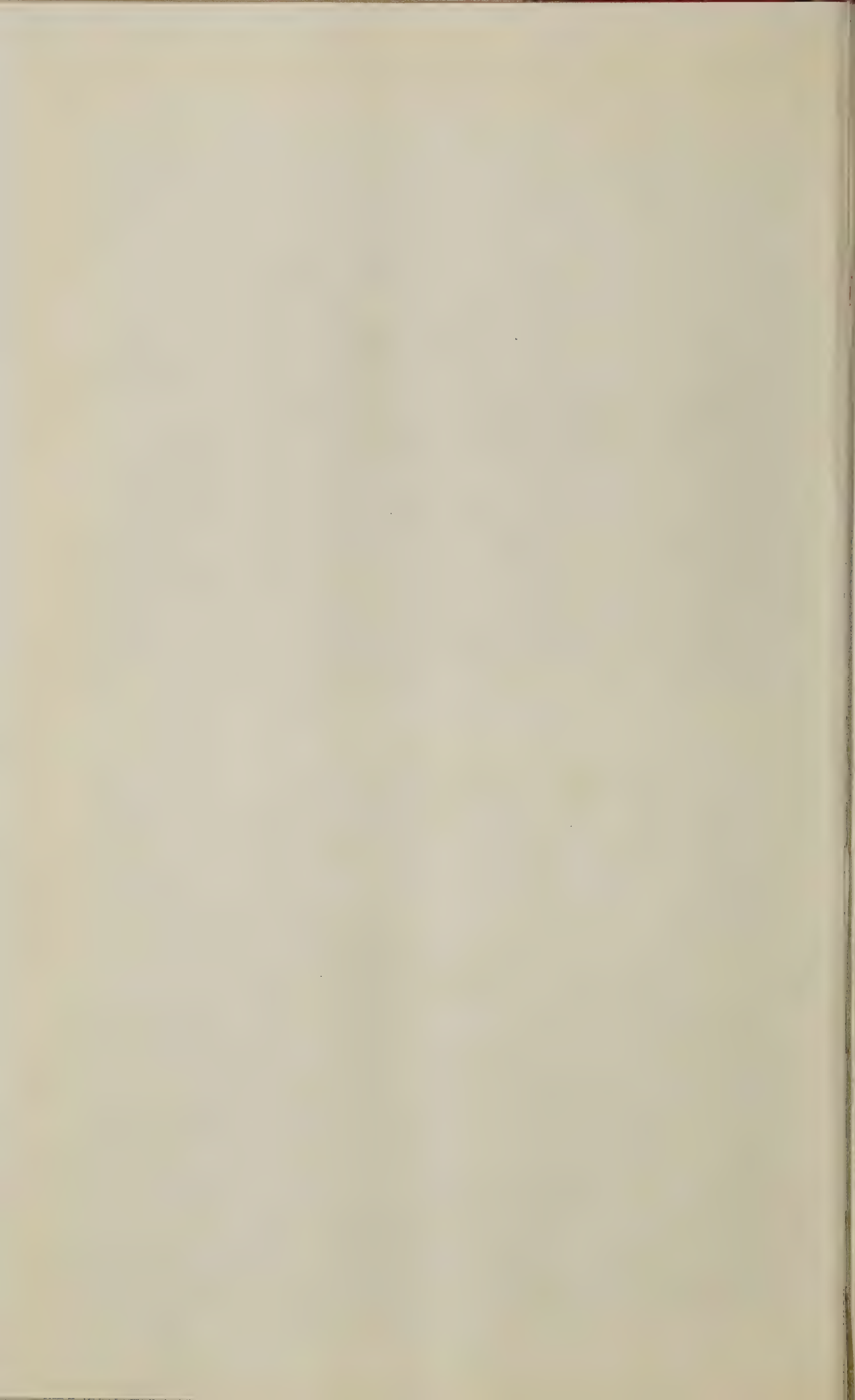
AYRSHIRE HEIFER—WINDYHILL DAVIDINA.



YEARLING AYRSHIRE BULL—NETHERTON KING GEORGE.



AYRSHIRE HEIFER—NETHERHALL QUEEN KATE.





AYRSHIRE HEIFER—TOWER BESS.



SHORTHORN HEIFER—WOOLMERS BLUE EYES.



Pedigree of Yearling Ayrshire Bull, Netherton King George.

Bred by Thomas Clements, Newtown, Mearns.

Sire—Netherton King Arthur (7413), by Bargenoch Durward Lily (5559);
g d—Blossom 3rd of Bargenoch (13074).Dam—Midland Young Greenfield (22621), by Mill of Shield Prince Galla
(5389); g d—Midland Greenfield (Vol. 30, page 697).Milking records of Netherton King Arthur's dam:—First year, 920
gallons, 4·5 per cent. butter fat; second year, 1,380 gallons, 3 per cent. butter
fat in 34 weeks; and giving 20·5 lb. milk at 5·1 per cent. at end of test.His dam, Midland Young Greenfield's milking records were: First year,
1,326 gallons, at 4 per cent.; second year, 1,752 gallons, at 3 per cent. This
animal was sold as a calf for 40 guineas.**Pedigree of Two-year-old Ayrshire Heifer, Netherhall Queen Kate, No. 25959.**

Bred by Thomas Scott, Netherhall, Lanark.

Sire—Netherhall Sir Robert (7044), by Morton Maine of Epicarmus (5793);
g d—Bell of Wynholm (11736).Dam—Netherhall Kate 18th (20303), by General Macdonald of Hill House
(4602); g d—Kate 8th of Netherhall.This cow was shown four times, and was awarded first prize on each
occasion, viz.:—At Lesmahagon Farmers' Society's Show, first at Hamilton;
first at Douglas; and first at Biggan.Her dam's record last year was 961 gallons (3·39 per cent. butter fat) in
39 weeks.**Pedigree of Tower Bess.**

Sire—Auchenbrain Prince Albert; registered number, 5806.

Sire of Sire—St. Simon of Auchenbrain; registered number, 4900.

Dam of Sire—Buntie 9th of Auchenbrain; registered number, 15005.

Dam—Tower Bess 2nd; registered number, 21321.

Sire of Dam—Nethercraig Traveller Again; registered number, 5233.

Dam of Dam—Tower Bess: App. Vol. 31, page 988.

Shorthorn Heifer, Woolmers Blue Eyes, 18 months old.

Sire—Woolmers Viscount (104439).

Dam—Blue Eyes, by Lieutenant (70767)

g d Beauty 5th, by Pearl Count
(61422)

g g d Beauty 4th, by Balmoral (44327)

g g g d Beauty 3rd, by Mar (40294)

g g g g d Beauty 2nd, by Schoolmaster
(39086)

g g g g g d Beauty, by Orthodox (32004)

g g g g g d Bella, by Richard (35266)

g g g g g d Mysie 7th, by Indispensable
(16295)

g g g g g d Mysie, by Casham (14248)

g g g g g d White Duchess, by Carlos (1788)

g g g g g d Picture, by Sultan (1485)

g g g g g d Fleur-de-Lis, by Albion (731)

g g g g g d Fleur-de-Lis, by Diomed (974)

g g g g g d Purity, by Barmpton (54)

g g g g g d Charity, by Wellington (679)

g g g g g d Dairymaid, by Sultan (631)

g g g g g d Ruth, by Son of Punch (531)

g g g g g d Broadhooks, by Hubback 319—
by Dalton Duke 188.

This heifer is from a deep milking strain. Her sire, Woolmers Viscount, is by Tuton Victor 5th, champion bull three years in succession—viz., 1906, 1907, 1908—at the Hertfordshire Show, England; also, champion in 1905 at Cork, Ireland. Daynton Braek Archer, who is a half-brother of Tuton Victor 5th, and is from a splendid dairy cow which gave 1,080 gallons in one year, was sold at R.A.S.C. for 1,000 guineas.

The dam of Blue Eyes is a fine dairy cow giving 1,020 gallons a year, and has bred several winners of first prizes.

A QUEENSLAND DAIRY.

In this issue appear illustrations of Mr. Martin Burk's dairy establishment at Coorparoo, which is recognised as being well equipped and up-to-date in every respect.

The milking-shed is an open one, and the concrete floors and sloping drains afford ample provision for the sanitation which is so essential for successful dairying operations.

ILLUSTRATIONS.

1. General view of the Dairy buildings.
2. Cow-yard at Milking time.
3. Cows in Stalls, at Milking time.
4. Looking down the stalls, showing the Milk Room.

Times of Sunrise and Sunset at Brisbane, 1911.

DATE.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		PHASES OF THE MOON.
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	4:56	6:45	5:20	6:42	5:40	6:21	5:57	5:47	8 Jan. ☾ First Quarter 4 20 p.m.
2	4:57	6:46	5:21	6:42	5:41	6:20	5:58	5:46	15 " ○ Full Moon 8 26 a.m.
3	4:58	6:46	5:22	6:41	5:42	6:19	5:58	5:45	22 " ☾ Last Quarter 4 21 p.m.
4	4:58	6:46	5:23	6:41	5:42	6:18	5:59	5:44	30 " ● New Moon 7 45 "
5	4:59	6:47	5:24	6:40	5:43	6:17	5:59	5:43	
6	5:0	6:47	5:24	6:39	5:43	6:16	6:0	5:42	
7	5:1	6:47	5:25	6:39	5:44	6:14	6:0	5:40	7 Feb. ☾ First Quarter 1 28 a.m.
8	5:1	6:47	5:26	6:38	5:44	6:13	6:1	5:39	13 " ○ Full Moon 8 37 p.m.
9	5:2	6:47	5:26	6:38	5:45	6:12	6:1	5:38	21 " ☾ Last Quarter 1 44 "
10	5:3	6:47	5:27	6:37	5:46	6:11	6:2	5:37	
11	5:3	6:47	5:28	6:36	5:46	6:10	6:2	5:36	
12	5:4	6:47	5:29	6:35	5:47	6:9	6:3	5:35	
13	5:5	6:47	5:29	6:35	5:47	6:8	6:3	5:34	
14	5:6	6:47	5:30	6:34	5:48	6:7	6:4	5:33	1 Mar. ● New Moon 10 31 a.m.
15	5:7	6:47	5:31	6:33	5:48	6:6	6:4	5:32	8 " ☾ First Quarter 9 1 "
16	5:7	6:47	5:32	6:32	5:49	6:5	6:5	5:31	15 " ○ Full Moon 9 58 "
17	5:8	6:47	5:32	6:31	5:50	6:4	6:5	5:30	23 " ☾ Last Quarter 10 26 "
18	5:9	6:47	5:33	6:31	5:50	6:3	6:6	5:29	30 " ● New Moon 10 38 p.m.
19	5:10	6:47	5:34	6:30	5:51	6:1	6:7	5:28	
20	5:11	6:47	5:34	6:29	5:51	6:0	6:7	5:27	
21	5:11	6:46	5:35	6:28	5:52	5:59	6:8	5:26	
22	5:12	6:46	5:36	6:27	5:52	5:58	6:8	5:25	
23	5:13	6:46	5:36	6:26	5:53	5:57	6:9	5:24	
24	5:14	6:45	5:37	6:25	5:53	5:56	6:9	5:23	6 Apr. ☾ First Quarter 3 55 p.m.
25	5:15	6:45	5:38	6:24	5:54	5:55	6:10	5:22	14 " ○ Full Moon 0 37 a.m.
26	5:15	6:45	5:38	6:23	5:54	5:54	6:10	5:21	22 " ☾ Last Quarter 4 36 "
27	5:16	6:44	5:39	6:23	5:55	5:53	6:11	5:20	
28	5:17	6:44	5:40	6:22	5:55	5:51	6:11	5:19	29 " ● New Moon 8 25 "
29	5:18	6:44	...	...	5:56	5:50	6:12	5:19	
30	5:19	6:43	...	...	5:56	5:49	6:12	5:18	
31	5:20	6:43	...	...	5:57	5:48	...	...	

Plate VI.



GENERAL VIEW OF THE DAIRY BUILDINGS.



COW-YARD AT MILKING TIME.



Plate VII.



COWS IN STALLS AT MILKING TIME.



LOOKING DOWN THE STALLS, SHOWING THE MILK ROOM.

The Horse.

IMPORTED STOCK.

Amongst the purebred horses, mares, and fillies purchased by Mr. J. Mahon, Principal of the Queensland Agricultural College, in England and Scotland for the Department of Agriculture and Stock, are the two-year-old Clydesdale stallion, Lord Cellus; two-year-old Clydesdale filly, Clodagh; three-year-old Clydesdale mare, Craigie Charm; and the Welsh pony stallion, The Welshman. Herewith we give illustrations, together with the pedigrees of the horses. Next month the pedigrees, &c., of the remaining imported horses will be published. All the animals have come in for unstinted praise by some of the best judges in Queensland and from the South:—

Pedigree of Two-year-old Clydesdale Stallion, Lord Cellus (15614).

Sire—Marcellus was champion horse of Scotland, winner of Cawdor Challenge Cup and many other prizes (No. 11100), by the champion horse, Hiawatha (11067). Hiawatha was winner of the Cawdor Challenge Cup in 1898, 1899, 1901. He is considered the champion horse of Scotland.

Dam—Lady Thomas of Cullen (20326)
 g d Lady Grace (13390)
 g g d Laurel (12438)
 g g g d Lily o' the Dale (8223)
 g g g g d Alice Grey (4995).

Lord Cellus was bred by the Countess Dowager of Seafield, Banffshire. The sire, Marcellus, realised 3,000 guineas; and his dam, Lady Thomas of Cullen, was sold for 1,000 guineas.

Pedigree of Two-year-old Clydesdale Filly, Clodagh.

Sire—Baron's Pride, the champion horse of Scotland (9122). Baron's Pride is the champion horse of Scotland, his progeny having won more prizes than any horse in Scotland.

Dam—Duchess (21576)
 g d Challoch Duchess (14310)
 g g d Daisy of Challoch (13172)
 g g g d Blossom of Challoch (8810)
 g g g g d Flora (845).

Clodagh was shown three times, and was awarded first prize on each occasion.

Pedigree of Three-year-old Clydesdale Mare, Craigie Charm.

Bred by Andrew Dewar, Arnprior, Port of Menteith. Foaled, 24th July, 1907.

Sire—Memento (13100).

Dam—Queen of Arnprior (14189), by Royal Gartly (9844)
 g d Bell of Rogerton (7223), by Darnley Yet (2719)
 g g d Maggie Hill (5094), by Glenamour (2128)
 g g g d Maggie, by Viceroy (1337).

Craigie Charm was served by Baron Ian (14584), by Baron's Pride (9122).

Dam—Princess Beautiful (14791), by Cedric (1087)

g d—Princess (13852), by Blue Ribbon (1961).

The above mare is bred from the very best strains of Clydesdale blood. Her sire, Memento, won first prize at Kilmarnock (a yearling), first at the Scottish National Stallion Show as a three-year-old, and also won the 100-

guinea Brydon Challenge Shield. Her g. sire, Royal Gartly, was only once defeated, and twice won the 50-guinea Challenge Cawdor Cup.

Baron Ian was twice first and champion at Aberdeen, also first at Glasgow as a two-year-old.

Pedigree of Welsh Pony Stallion, The Welshman.

Four years old; 12 $3\frac{1}{2}$. Volume 9, W.S.B. Book.

Sire—Golden Gleam.

Dam—Rose, by Eiddwyn Flyer.

This pony was second to his sire, Golden Gleam, now the property of D. Allman, Warwick. Golden Gleam was never beaten in a show ring in England or Wales, having been awarded numerous prizes.

FRENCH HORSES.

The Percheron.

In an article communicated to the Press, Mr. John Mahon, Principal of the Queensland Agricultural College, gives some account of the French horses he saw in the Department of Orne, in the north of France, including the Percherons. Mr. Mahon writes as follows about them:—

During my travels I had not seen a better class of horse than those in France, both of light and heavy types. The horses used in the army are magnificent specimens; being low, thick set, standing on splendid legs, with remarkably good bone and muscle, and beautifully "topped."

The cart-horses used in the streets in Paris, and on the farms in the different parts of France, are beautiful animals indeed, being of the Percheron breed. In colour: Blacks, dapple greys, and steel greys. These animals are very powerful, low, thick-set beasts, round in the barrel, broad in the chest; short necks, well set into the shoulder; nice, intelligent heads; good legs, with splendid flat bones, short below the knee and the hock. If faulty, it is of the shortness in the pastern. It is surprising to see the heavy goods these animals haul, and the paces at which they travel under such loads. The Percheron is largely used in crossing with light mares to produce either an army or light harness horse. I have been informed that most of the London omnibus horses were bred with a considerable amount of Percheron blood. The 'bus and light harness in Paris are nice "chubby" animals, capable of pulling heavy loads, and travelling at a fast pace. The Percheron horse is rapidly coming into favour outside its native home—not only as a purebred animal, but also for crossing purposes. The Americans, the Argentine, and Canada are buying up largely, and paying very high figures for these choice animals.

There are about 3,100,000 horses in France. The markets are England, Germany, Belgium, United States, Argentine, Italy, Spain, Austria, and Hungary. There is much more difficulty in securing mares than stallions, for the reason that the French Government are big buyers of the best mares, which are retained for breeding purposes. There is also a big demand by the French farmers for mares, for working and breeding purposes.

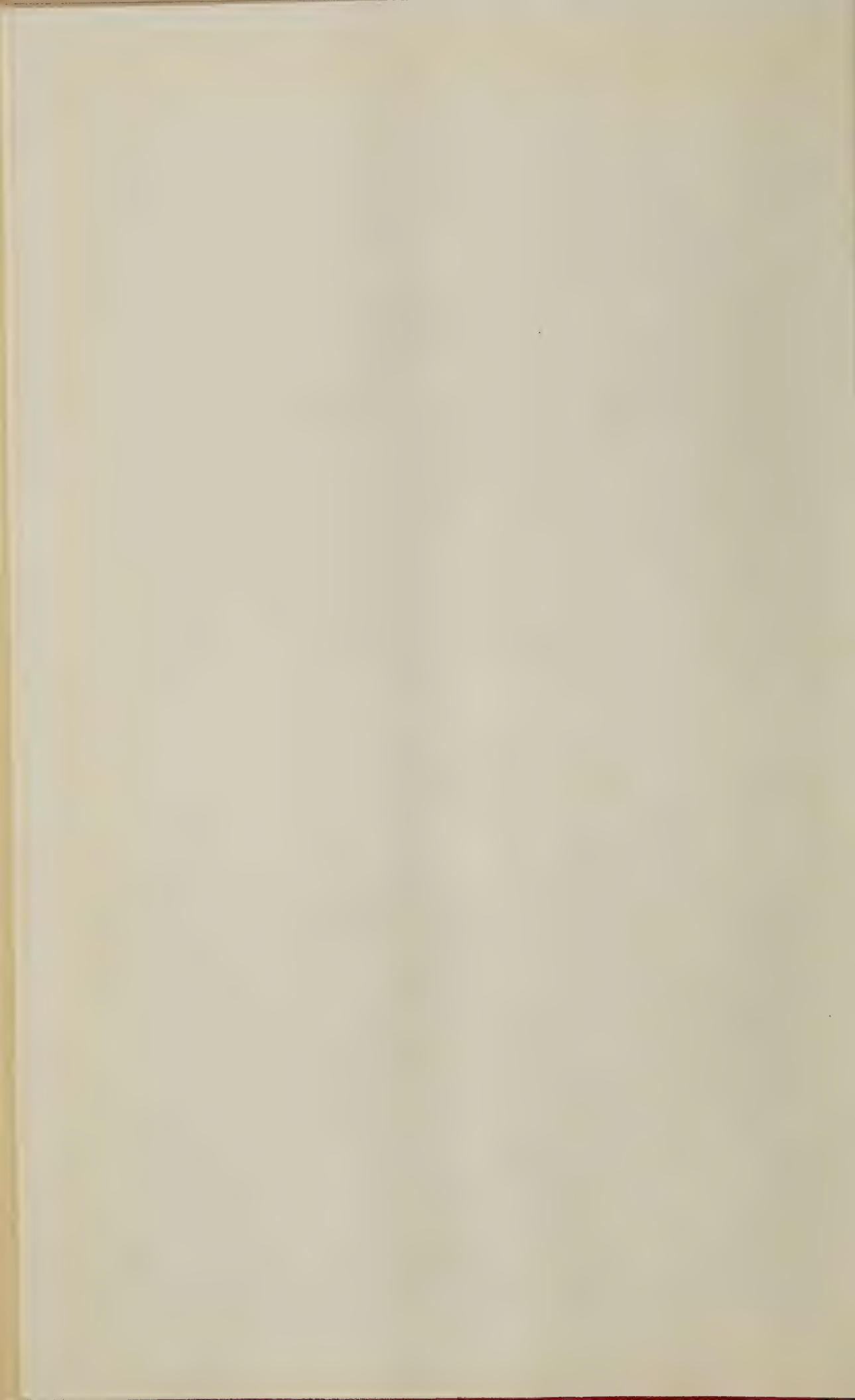
In regard to the purchasing of horses by the Canadian and Argentine people, the animals must be full pedigreed and registered in the stud-book; they are otherwise considered unsuitable for reproducing the desired class of



CLYDESDALE STALLION—LORD CELLUS, 15614.



CLYDESDALE FILLY—CLODAGH.

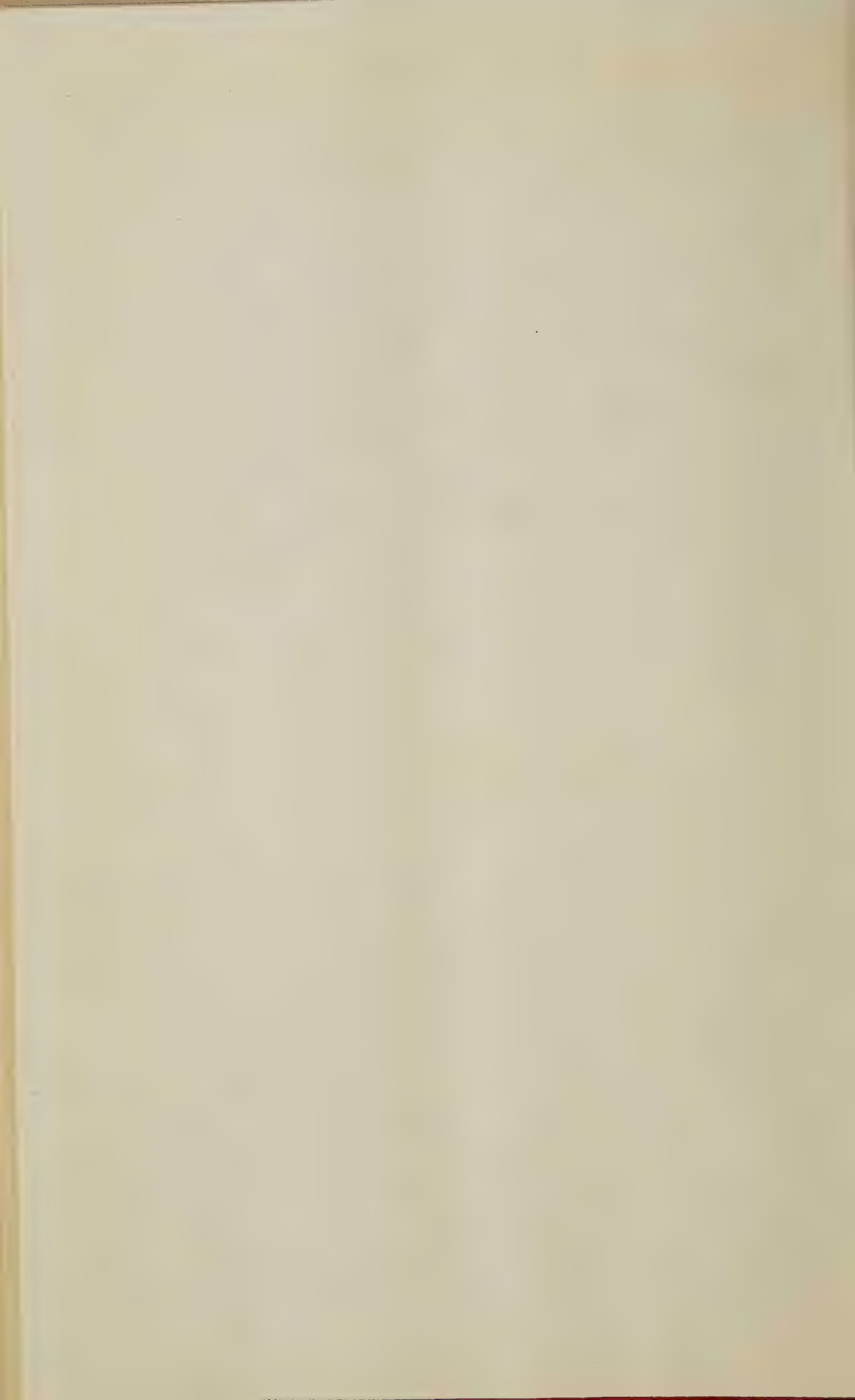




CLYDESDALE MARE—CRAIGIE CHARM.



WELSH PONY STALLION—THE WELSHMAN.



horse. The Canadians are so pleased with the results of their many years' experience of the "Percheron" horse that in 1876 they established a Percheron Stud-book, in which none but the best animals are entered, and none other than those registered are considered suitable for breeding the class of horse wanted. I had the privilege and pleasure of visiting this magnificent establishment in company with a Mr. J. Wittinan, of Western Australia, who is a good judge of horses, and who was kind enough to motor me through France and Germany. This stud farm, which is only one of many similar, is situated at a place named "Orne," in the north of France, about four hours' journey from Paris by train. The area of land comprised about 2,000 acres, upon which magnificent stables are erected. The way in which the stables and harness are kept is something not to be forgotten. At the time of our visit there were 320 stallions in the stables and 30 cart or working horses. It is needless to say what a beautiful sight it was. I am sure some of the finest horses in the world are located in these stables. We had with us a highly-educated Frenchman, who could speak English, which helped us considerably. Those in charge of the horses and stables are prohibited from giving information or allowing animals to be photographed.

The horses in the stables consisted of 120 Anglo-Norman trotters, 80 Percherons, 20 Norfolk trotters, 80 Normans, 20 thoroughbreds. I made notes of the different breeds. I was informed that the French Government have 2,400 stallions located in the different parts of France, where the country is suitable for horse-breeding. No encouragement or assistance is given to horse-breeding on unsuitable land, much importance being placed on soil and water. The country surrounding the place on which these stallions are kept is hilly limestone land, well sheltered, with beautiful running streams at short intervals apart. The water is heavily impregnated with lime and iron. The French breeders consider that soil and water are responsible for the splendid bone and muscle for which their horses are noted. No mares are kept at this stud farm. The stallions are kept for the use of the farmer. Approved mares only are being mated with these horses. A small fee of 20 francs (16s. 8d. English money) is charged. The Government reserve the right to buy the foals (when weaned) at the fixed price, which is based on the quality of the foal, the merits of sire and dam being taken into consideration. If found unsuitable, it is rejected, and the breeder disposes of it as best he can. Private owners are prohibited from using their own stallions unless approved by the Government.

In France due notice is given that the annual inspection of privately-owned stallions for stud purposes shall take place in the different centres. The animals are first inspected for quality and conformation by competent judges, and if approved are then passed on to the veterinary surgeon, whose duty it is to examine for soundness. If passed, the horse is branded on the neck, the brand being a small heart, which is applied by means of a fire brand. Animals are examined annually for sight and wind. I spent two days motoring through the Orne and Nogent le Rotron districts—the home of the Percheron horse. I found the mares are all in the hands of farmers, who keep numbers in proportion to the size of their farms, varying from two to six. These mares are used for farm work, and are worked up to within three weeks of foaling; four weeks after foaling, the mares are again put to work. The foals are kept in the stables and taught to eat soft foods. They run with mothers at night time, and are allowed to suck when the mother is brought home for the midday meal. When the colts reach the age of 12 months, they are brought up by dealers who are in possession of farms. These colts are well fed, handled, and taught paces. They are kept over until such time as buyers come along. If unsuitable for stud purposes, they are sold to carriers.

Tropical Industries.

GROWTH, CULTIVATION, AND MANURING OF SUGAR-CANE.

Abstract of a Lecture delivered by J. C. Brünnich, Chemist to the Department of Agriculture and Stock.

In the last Annual Report of the Bureau of Sugar Experiment Stations, based on ten years' experience, practical hints on the maintenance of the fertility of sugar lands, and on mixtures of artificial fertilisers suitable for general application, were given. The object of this lecture is to study the growth of sugar-cane, to deduct therefrom its manurial requirements, and to consider the value of the different fertilisers in a brief and practical manner.

Sugar-cane, like all higher plants, requires for its successful growth the four "*elements*" of the old Greek philosophers: "EARTH, WATER, AIR, AND FIRE"—considering the heat and light supplied by the Sun to the Earth as fire; because plants must "eat, drink, breathe, and get light and heat."

The Earth, or rather the **Soil**, is the foundation of all agriculture, and, as the maintaining of the fertility of the soil is the chief object of this lecture, we will leave its consideration to the last.

Water is of equal importance, and it is found in the soil in the form of ground water, capillary water, and hygroscopic moisture. The conservation of moisture in the soil ought to be one of the chief aims of a sugar-grower. The soil must be considered as a reservoir for the storage of rainwater, so that the plant can draw its necessary supply of water, by the aid of the roots, whenever required.

The loss of water after every rainfall is very considerable, a large amount simply runs off, part is lost by percolation to lower depth, and another part is lost by evaporation. These losses are quite different in various classes of soil, and are least in a sandy loam rich in humus. But, even in soils not so suitable for the storage of water, the farmer has it in his own hands to improve the water absorbing and holding capacity by suitable methods of cultivation. A large amount of water, chiefly on which the plants are depending, is held in the soil in the form of a fine film covering the soil particles, often called **capillary water**, and the soil water may rise in this form, from the ground water to the surface, if such standing water exists at certain depth. The capillary action depends largely on the size of the soil particles, and is therefore very weak in coarse sandy and gravelly soils, but much better in good loamy soils. For this reason fine-grained, deep, sandy loams are least affected during times of drought. The **evaporation** of this capillary soil moisture near the surface exceeds in our State frequently the rainfall, and **thorough cultivation** and **mulching** again will decrease this loss. Any material spread upon the surface of the soil, to shade it from the direct rays of the sun, will act as a mulch; loose organic materials—hay, straw, trash—will be most suitable; but even logs and large stones keep the soil moist and cool, and the great fertility of some of our stony scrub lands is partly due to the sheltering

action of the large boulders. By thorough stirring up of the top soil, the capillary film of moisture is broken and the evaporation thereby lessened. The difference between the soil moisture in soils after different treatment of cultivation is quite astounding, and the results of such tests carried out at our Roma State Farm on wheat lands, which were published in our last annual report, are highly instructive.

The importance of conserving every drop of water in a soil becomes apparent when we are told that for the production of every pound of dry material in a plant at least 300 lb. of water are necessary. A cane crop giving 30 tons of crushable cane contains about 13 tons of dry matter, for the production of which at least 4,000 tons of water per acre, equivalent to a rainfall of 40 inches, are necessary. It will interest our sugar-growers to learn from the reports of the Hawaiian Sugar Experiment Station that on these islands, with an average rainfall of 46 inches alone, a crop of cane yielding only $\frac{3}{4}$ ton of sugar per acre was obtained, whereas an additional 46 inches of water supplied in proper intervals as irrigation water yielded crops giving up to $10\frac{1}{2}$ tons of sugar per acre. The experiments also showed that over-irrigation can lead to losses, and gives reduced yields.

We will now consider the importance of air to the growth of cane, and learn in the first place that all the carbon necessary for the building up of the plant structure is obtained from the very small amounts of carbonic acid gas present in our atmosphere. The air contains only about 3 parts of carbonic acid in every 10,000 parts; or in a cubic yard of air, which weighs about $2\frac{1}{4}$ lb., we find only 7 grains of carbonic acid. Now, if we consider that a 30-ton crop of cane represents about $13\frac{1}{2}$ tons of dry organic matter forming stalks, tops, and trash, and that this organic matter consists of about $6\frac{1}{2}$ tons of carbon, we will understand what an enormous volume of air is necessary to supply the carbon. A column of air, covering an acre of ground and about 20 miles in height, if we assume a uniform composition of the air, would be necessary to supply the necessary amount of carbonic acid. As a matter of fact, however, the amount of carbonic acid decreases with the height, and at an elevation of 18 miles no carbonic acid is supposed to exist in our atmosphere. All the work necessary to change the carbonic acid into the most complex organic compounds, like starch, sugar, cellulose, &c., is carried on in the leaves of the plant, into which the air enters through very minute openings found on the surface of the leaves, and the actual work is done by the aid of the sunlight absorbed by the green colouring matter (chlorophyll) of the leaf cells. In this complex chemical process water, and small amounts of mineral substances obtained from the soil by the aid of the root, and circulated in the plant by the aid of water in the plant sap, play an important part. This process of assimilation again represents an enormous amount of work, the energy of which is supplied by the sun, and a rough estimate for a 30-ton crop of cane per acre gives the daily work to be about 20,000-horse power, equivalent to the work of 100,000 men.

The plant foods necessary and aiding in this wonderful chemical work of formation of organic compounds are: Nitrogen, and the mineral constituents potash, phosphoric acid, and lime, which, with small amounts of other elements, have all to be supplied by the soil. Each of the constituents plays its own important part in plant nutrition, and if only one is missing or is even only very deficient no healthy growth can take place.

Potash is most abundantly found in the young leaves and growing parts of the plants, and appears to be intimately connected with the production of starch, sugar, and other carbohydrates in the leaves. This fact is of particular importance to sugar-growers, as we may safely say that *without potash no sugar* could be produced in the cane.

Nitrogen promotes the growth of leaves and stems, but by producing a luxuriant growth rather retards the maturing of plants.

Phosphoric acid has a ripening effect on plants; it exists largely in union with other organic compounds, and is also associated with the important nitrogenous bodies.

Lime, although generally not considered an actual plant food, yet seems to be absolutely necessary to plant life, and it is often found in plant cells in form of insoluble crystals, chiefly of calcium oxalate, and appears to prevent a dangerous accumulation of organic acids in the plant cells. In the soil the lime aids in the decomposition of organic matters, and also liberates and thus makes available other mineral plant foods. Its chief actions, however, are to improve the physical condition of the soil and to counteract acidity.

The requirements of different plants with regard to these foods vary considerably, and with regard to sugar-cane it has been found elsewhere that even the different varieties of cane require various amounts of plant foods. Unfortunately, no work in this direction has hitherto been carried out by the Sugar Experiment Stations in Queensland, whereas in the Experimental Stations in Hawaii and Java a very large amount of this work has been done, with great beneficial practical results. Years ago, when in the employ of the Colonial Sugar Refining Company at Homebush Mill, I analysed several varieties of cane with the view of ascertaining the amounts of plant food they contain. In order to get some more recent information, I asked Mr. Pringle, of the Bundaberg Sugar Experiment Station, to obtain a sample of the favourite Bundaberg cane, "**D 1135**," a **Demerara seedling cane** originally introduced by Messrs. Young Bros., of Fairymead Plantation. Mr. G. Patten carried out at our laboratory a complete analysis of the cane, tops and green leaves, and trash, the results of which are given on the attached Table I.

I also give on Table 2 a comparative statement of similar data obtained by me at Mackay, and of investigations carried on by others elsewhere. It will be noticed that the amounts of phosphoric acid and of nitrogen do not show such a great variation as the amounts of potash. The Bundaberg cane contains quite an exceptional small amount of potash in the cane ash and also in the trash. Various reasons may account for this fact, perhaps because the cane is grown on soil exceptionally low in potash, like most of that district, or the cane is likely a variety which makes a small demand on potash. This would be an excellent feature and account for the fact that this variety does so well in the Bundaberg district. We find only 25 lb. of potash in an estimated 30-ton crop of cane, whereas the tops and green leaves of this cane, which weighed only 5 tons, contain nearly 44 lb. of potash. A 35-ton crop in Java contained 85 lb. of potash, a similar crop in Upper Egypt 89 lb., and a 93-ton crop of Rose Bamboo, which makes great demands on potash, in Hawaii, contained 631 lb. of this valuable plant food. A comparison is made more easily by giving the calculated figures of **lb. of plant foods removed from the soil by every ton of cane**; and we find from Table 2 that D 1135 takes only 8 lb., whereas Rose Bamboo in Mackay takes 2·4 lb., and in Hawaii even 6·8 lb. per acre.

TABLE I.

Analysis of Cane—"D 1135."

18 Months Old Plant Cane, from Bundaberg District.

						Cane Trash.	Cane Tops and Green Leaves.	Crushable Cane.	
								Analysis of Cane Fibre.	
Moisture	...	...	...	...	...	13·20	66·71		71·50
Total organic matters	...	...	...	...	...	80·65	31·26		28·12
Of which—									
Fibre (usual method for cane analysis)	...				...	...	...	12·13	= 100
Fibre (acid alkali method)	...	...	...	...	...	38·48	12·32	7·86	59·1
Fibre (König's method)	...	...	...	...	...	26·58	8·33	5·24	43·3
Pentosans	...	...	...	...	...	23·57	8·16	4·27	30·8
Cane Sugar	...	...	...	...	...	...	...	16·59	...
Glucose	...	...	...	...	...	...	...	·41	...
Other organic matters undetermined	...				...	21·59	10·88	·64	22·7
Nitrogen	...	...	...	...	...	·443	·298	·095	·267
Ash	...	...	...	...	...	6·15	2·03	·38	1·56

Analysis of Ash.						Per cent.	Actual Amount in Trash.	Per cent.	Actual Amount in Tops.	Per cent.	Actual Amount in Cane.
Silicic acid	...			SiO ₂	68·45	4·213	44·93	·912	36·09	·139	
Iron and alumina	...	Fe ₂ O ₃ + Al ₂ O ₃	3·80	·234	2·61	·053	7·86	·030			
Manganese	...	MnO	·23	·014	·29	·006	·54	·002			
Lime	...	CaO	11·88	·731	8·35	·170	11·95	·046			
Magnesia	...	MgO	4·49	·276	8·73	·177	12·88	·050			
Potash	...	K ₂ O	2·67	·165	19·13	·389	9·62	·037			
Soda	...	Na ₂ O	2·30	·141	2·89	·059	·64	·002			
Sulphuric acid	...	SO ₃	4·35	·268	5·70	·116	11·18	·043			
Phosphoric acid	...	P ₂ O ₅	1·35	·083	4·31	·088	8·96	·034			
Chlorine	...	Cl	·75	·046	3·96	·081	·37	·001			

Weight Per Acre (estimated)						4 tons	5 tons	30 tons
Total organic matter	per acre	...	...	...	...	7,226 lb.	3,501 lb.	18,896 lb.
of which Nitrogen	"	...	...	...	...	40 "	33·4 "	63·8 "
Sugar	"	...	...	...	...	...	...	11,148 "
P.O.C.S.	"	...	...	...	...	...	...	10,000 "
Total Ash	"	...	...	...	...	452 lb.	227 lb.	255 "
of which Lime	"	...	...	...	...	65·4 "	19·0 "	30·9 "
Potash	"	...	...	...	...	14·8 "	43·6 "	24·9 "
Phosphoric Acid	"	...	...	...	...	7·4 "	9·9 "	22·8 "

TABLE II.
PLANT FOODS, Removed by Cane Crops.

District :	BUNDABERG.		MACKAY.						JAVA.		EGYPT.	MALAGA.	HAWAII.	
Variety :	D 1135.		Average Sample of Various Var., chiefly Rose Bamboo.		Rose Bamboo Plant.	Rose Bamboo Ratoon.	Daniel Dupont Plant.	?	?	?	?	Rose Bamboo.	Lahaina.	
Removed by :	Whole Crop.	Cane.	Whole Crop.	Cane.	Whole Crop.	Whole Crop.	Whole Crop.	Whole Crop.		Cane.	Cane.	Cane.	Cane.	
Tons per acre	37	30	25	18	...	...	...	42	35	34	...	93	86	
Total lb. per Acre of—														
Nitrogen	117	64	?	?	...	...	...	74	45	27	47	270	114	
Potash	96	25	93	44	...	...	...	171	85	89	67	631	436	
Phosphoric acid	36	23	55	22	...	...	...	53	40	64	80	112	136	
Removed per 1 ton of cane—														
Lb. per acre of—														
Nitrogen	3.9	2.1	?	?	?	?	?	2.1	1.3	.8	?	2.9	1.3	
Potash	3.2	.8	5.2	2.4	5.2	2.8	7.6	4.9	2.4	2.6	?	6.8	5.1	
Phosphoric acid	1.2	.8	3.1	1.2	1.4	1.4	1.9	1.5	1.1	1.9	?	1.2	1.6	

Very large amounts of plant foods are removed by the heavy crops of cane, yielding 10 tons of sugar per acre and more, obtained on the Hawaiian Islands, as seen from the figures below, taken from the Reports of the Experiment Stations :—

	In Leaves, Tops, and Dead Canes.			In Crushable Cane.		
	Nitrogen.	Potash.	Phosphoric Acid.	Nitrogen.	Potash.	Phosphoric Acid.
	lb.	lb.	lb.	lb.	lb.	lb.
Lahaina	262	887	99	114	436	136
Rose Bamboo	352	1,115	97	270	631	112
Striped Singapore ...	297	936	77	177	461	94

Considerable amounts of plant foods will of necessity accumulate in the dead leaves—the **trash**—of the cane. I estimated the quantity of trash given by the Bundaberg cane as 4 tons per acre, as I have no records of actual weights of trash obtained in Queensland. This estimate does not appear to be too high for a good crop of cane, as I find that in Honolulu actually 17 tons of trash were obtained per acre, whereas in Java a total crop of 44 tons gave 3 tons of tops and 5·3 tons of trash. The trash in Hawaii contained 42 per cent. of nitrogen from Lahaina cane and 53 per cent. from Rose Bamboo, and in the ash 14·74 per cent. and 14·19 per cent. of potash, 1·26 per cent. of phosphoric acid, and 4·8 per cent. of lime—rather remarkable when compared with our D 1135 trash, which contained only 2·7 per cent. of potash, but 11·9 per cent. of lime.

When trash is burned off, a large amount of plant foods, principally the nitrogen, are lost, and for this reason trash should not be burnt, unless the grower is compelled to do so on account of insect pests and disease. The trash, furthermore, forms an excellent mulch, keeps down weeds, and conserves moisture.

From the figures given it can be easily understood how successive crops of sugar-cane must exhaust a soil, and, furthermore, that certain varieties can actually do so much quicker than others.

In ideal farming a **rotation of crops** is always carried out to maintain the soil fertility as long as possible, but in the cultivation of sugar-cane this is not easily done, and it is only under quite exceptional conditions, like those existing on Java, that a rotation is made possible. In Java cane is only used as plant cane; and, after a crop of cane is taken off, other crops, chiefly rice, are grown for two years before cane is planted again. On Hawaii sugar lands are never allowed to exhaust, but are systematically manured from the very start, and it was found by careful experimenting that land even producing 10 tons of sugar per acre may be fertilised with profit as long as climatic conditions and water supply are favourable. They also found that different varieties require various fertilising mixtures, and that if the soils contain apparently a sufficiency of available plant foods the use of artificial fertilisers will give greatly increased crops. At the same time it was shown that the purest and richest juices were obtained from unfertilised areas, just as we frequently find that poor light crops give a high-class juice, although, of course, in smaller quantities than that obtained from heavy crops.

In order to maintain the fertility of soil by fertilising, we must bear in mind the different objects of manuring, which are :—

1. To supply actual deficiencies of plant foods and to add to the soil for each crop at least the amounts removed by the crop;
2. To increase the activity of the beneficial bacterial flora;
3. To improve the physical condition of the soil.

The first and main object may already be understood from the remarks previously made, but the second object is generally more obscure and not widely enough known. Micro-biologists tell us that there are from 1 to 60 millions of bacteria in every gramme (about 15 grains) of soil, and that some of the most important changes, as *absorption of atmospheric nitrogen, change of ammonia salts into readily available nitrates, decomposition and putrefaction of organic matters, production of humus*, which continually take place in soils, are due to the activity of the microscopic flora.

The work of some of the bacteria is beneficial to higher plant life, the activity of others again highly detrimental, and for this reason experiments in which soils were partially sterilised before planting gave increased crops because the injurious bacteria were destroyed.

Soil bacteria not only require moisture and suitable temperature to thrive, but also certain amounts of plant foods, chiefly humus and phosphoric acid. The soil must also be in good physical condition, not too wet or acid, and well ventilated to give the bacteria a good supply of oxygen. For these reasons thorough tillage will aid the activity of the soil bacteria, and the old saying of Jethro Tull's, in his "New Horse-hoeing Husbandry," 170 years ago, that "Tillage is Manures," is based on a sound scientific principle.

A sugar-grower should never forget the fact that, unless his ground is well tilled, manuring with artificial fertilisers will do no good.

We will now consider in what forms the necessary plant foods—nitrogen potash, and phosphoric acid—can be supplied to the crop.

Nitrogen is the most expensive of the three plant foods, valued at present from 14s. 6d. to 16s. per unit, which means the cost price of 1 per cent. per ton of manure in Brisbane, so that, for instance, a "dried blood," with 12 per cent. of nitrogen, would be worth $12 \times 14/6$, or £8/14/- per ton. Nitrogen in the form of **nitrate** is the quickest acting, and for this reason **nitrate of soda** and the newly introduced manure **nitrate of lime** are frequently used as top dressings to growing crops. Nitrate of soda (Chili saltpetre) has, however, the great fault of not being readily retained and absorbed by the soil, and in the case of heavy rains, following the application, may be completely washed out. Nitrate of lime appears to be better absorbed, resembling more the ammonia salts which are completely retained in soils, and for this reason nitrate of lime should be an excellent manure for our sugar lands, many of which are deficient in lime; and top dressing cane a few months old with 1 to 2 cwt. of this fertiliser should give good results. Nitrogen in the form of ammonia salts, as **sulphate of ammonia**, and also in form of organic nitrogen like in **dried blood**, must be changed into nitrates by the activity of nitrifying bacteria, and is for this reason not so readily available to plant life. The action of the artificial product calcium **cyanamide** or **nitrolim** seems to lie between the availability of nitrates and ammonia salts, and should also be an excellent fertiliser for sugar-cane.

In Java, on account of the peculiar methods of cultivation, already mentioned, manuring sugar crops with 40 lb. of nitrogen per acre alone gave best results, and nitrates gave less cane but more and purer juices. In Queensland we will find that a top dressing with nitrogenous manure will only give the best economic results, if other manures containing phosphoric acid, potash, and perhaps part of the nitrogen were supplied liberally at time of planting.

The poor and yellow appearance of the leaves of cane is frequently an indication of the want of nitrogenous manure.

Potash is generally used in the form of **sulphate of potash**, which contains from 50 to 52 per cent. of potash, equivalent to 92.5 and 96.2 per cent. of potassium sulphate. The unit value is about 5s. 6d. so that an average quality of this fertiliser is worth about £14 per ton, but of course may be obtained at much lower rates, if purchased in large quantities.

Phosphoric acid may be applied in three different forms :—

1st, as **water soluble phosphoric acid**, as found in **superphosphates**, and in this form it is most readily available to plant life.

2nd, as **citrate soluble phosphoric acid**, as found in **Thomas phosphate** or **basic slag**, and also in **superphosphates** after being kept for some time, particularly if allowed to get wet, and also in the **superphosphate** used as fertiliser after being in the soil for some time. In this form the phosphoric acid is not soluble in water, but soluble in solution containing organic acids and their salts, and for this reason fairly readily available to plants.

3rd, as **citrate insoluble phosphoric acid**, as found in **bones**, **bone ash**, **bone char**, and **mineral phosphates**, in which form the phosphoric acid is insoluble in water or weak acids, and is only very slowly absorbed by the plant roots, and may remain for years in the ground before all is used up. In many of our soils an extravagant and useless large application of bone meal may now be traced by soil analysis. The finer the bone meal or mineral phosphate, the greater the value as fertiliser. Bone meal also contains a certain amount of organic nitrogen, which greatly increases its value as a fertiliser. Our **meat-works manures**, generally mixtures of dried blood, bone, boiling-down refuse, and offal, contain from 14 to 25 per cent. of insoluble phosphoric acid, and from 3 to 5 per cent of organic nitrogen, and are worth from £4 to £7 a ton according to the composition.

I must not omit to mention among the fertilisers **Molasses**, the by-product of sugar-mills, and occasionally used as a manure. Experiments carried out in Java and Hawaii have not given conclusive results. Light soils appear to benefit more than heavy soils, but in all cases it is best to apply molasses, at the rate of 200 to 400 gallons per acre, several weeks before planting, and not to growing cane. Molasses contains about $\frac{1}{4}$ per cent. phosphoric acid, $3\frac{1}{2}$ to 4 per cent. of potash, $\frac{3}{4}$ per cent. of nitrogen, and $1\frac{1}{2}$ per cent. of lime, and are really of much greater value as a food for cattle and horses than as a manure. The ashes of molasses, as obtained in mills where molasses are burnt, are rich in plant foods, containing from 38 to 44 per cent. of potash, $1\frac{1}{2}$ to 3 per cent. of phosphoric acid, 8 to 20 per cent. of lime.

With regard to the purchase of artificial fertilisers, I must mention that our farmers are fully protected by "**The Fertilisers Act of 1905**," and every farmer has the right to get samples of manure, purchased by him, analysed at our laboratories for a nominal fee. As an example, I may quote that quite recently one of our sugar-growers submitted a sample of a mixed fertiliser sold to him by one of the Northern mills, which he desired to know the value of, as he paid a very high price for this manure. Our analysis showed the manure was worth about £11 per ton in Brisbane, so that the price paid by the farmer was not at all excessive. From time to time samples of all manures offered for sale are taken throughout the State by our officers, and the result of the analyses are published in the *Agricultural Journal*.

When applying artificial fertilisers, excess of certain plant foods may be very detrimental, and, particularly large excess of nitrogen and potash, may do harm to crops. An excess of phosphoric acid does practically no harm on account of the insolubility of the compounds after being for some time in the ground.

The standard fertiliser for sugar-cane given by the Sugar Experiment Station contains 50 lb. each of nitrogen and potash and 45 lb. of phosphoric acid applied in the form of—

250 lb. sulphate of ammonia
100 lb. sulphate of potash, and
300 lb. superphosphate, per acre.

Alternative formulas are—

150 lb. sulphate of ammonia	} per acre,
150 lb. sulphate of potash	
300 lb. meatworks manure,	

the sulphate of ammonia preferably to be applied in two lots, the second half as top dressing.

No. 3—

200 lb. nitrate of soda	} per acre.
200 lb. sulphate of ammonia	
150 lb. sulphate of potash	
350 lb. superphosphate.	

Nitrogen again to be applied in two lots. In all these formulas probably the use of nitrate of lime or of nitrolin instead of the sulphate of ammonia or nitrate of soda may give better results. The formulas given supply the requirements of the cane with plant foods, and compare well with formulas used elsewhere.

On the Experiment Station, Cheik Fadl, in Upper Egypt, a fertilising mixture of—

178 lb. of nitrate of soda
357 lb. of superphosphate
178 lb. of sulphate of potash, per acre,

gave best results with 34 tons of cane per acre.

In Churriana (Malaga) an application of—

134 lb. nitrate of soda
134 lb. ammonium sulphate
446 lb superphosphate
134 lb. potassium sulphate, per acre,

gave an increase of 159 per cent. in weight of cane over the unfertilised block.

In Hawaii mixed fertilisers, supplying on an average about 60 lb. each of the three principal plant foods, give the best all round results.

Before concluding my remarks, I must draw attention to the great food value of sugar-cane tops, which contain large amounts of readily digestible carbohydrates, fair amounts of proteids, and mineral matters. I must also add, and make here public, that we have made numerous tests for the presence of a hydro-cyanic acid yielding glucoside which is always present in the closely-related fodder plants—sorghum, maize—and also in bamboo; but have never found any traces in different varieties, of various ages, which of course does not give an absolute proof that it may not be found in certain varieties and under certain conditions of growth. Sugar-cane chop-chop should make excellent ensilage and I would like to see trials made in this direction, and samples of such ensilage submitted to us for analysis.

In the table of analyses, which were made more fully by Mr. Patten than usually done, the fibre of the cane, as generally determined in sugar-mill laboratories, was further analysed, and was shown, according the fourth column in Table 1, to contain only about 43 per cent. of cellulose, and for this reason the megass is not a very suitable material for paper-making.

THE BAMBARRA GROUND NUT.

Some three months ago we received from Mr. R. Echlin, of Gatton, a packet of seeds of a species of earth nut obtained whilst he was in South Africa, for which he gave us the native African name "Masubla." As showing its value as a food for man, he stated that he had occasion to send a native on a 100-mile journey, and all the food the messenger took with him was a bag of these nuts. He completed his journey, and returned looking healthy and fit for another trip, having lived entirely on the nuts.

The "Agricultural News," Barbados, published an account of a ground nut known in the Mauritius as "Pistache malgache," which appeared in Bulletin No. 21 of the Station Agronomique, Mauritius.

The seeds sent to us by Mr. Echlin we sowed at once, after distributing a number amongst the State farms and the Queensland Agricultural College and the Brisbane Botanic Gardens. All that we sowed germinated; and when the nuts are ready, we will publish the results.

It is from No. 21 above-mentioned Bulletin that most of the information contained in the following article is taken. Interesting facts concerning the plant may also be found in the "Kew Bulletin," 1906, pp. 68 and 192; and in "Der Tropenpflanzer," Vol. III., p. 169. Short mention was made of it in the "Agricultural News," Vol. V., p. 276:—

Origin.—In the first of the references that are made above, in the "Kew Bulletin," it is stated that the plant is of African origin, and that it derives its name of the Bambarra ground nut from a district on the Upper Niger, near Timbuctoo. This does not give a full idea of its occurrence, however, for it is cultivated throughout Tropical Africa, from the Sahara to Natal.

Description.—The Mauritius bulletin, to which reference has been made, states that this plant belongs to the family of leguminous plants, and that it is thus capable of making use of the nitrogen of the atmosphere. It is somewhat similar to the ordinary ground nut (*Arachis hypogæa*), but its development of leaves is less abundant; it affords a smaller amount of vegetable matter after it has been harvested, and its cultivation improves the soil to a smaller extent than that of the ground nut. None the less, it is claimed that the cultivation of this plant deserves extension, because it is capable of furnishing useful quantities of nutritious material, and because the digging of the nuts is conducted in a far easier and cheaper manner than that of ground nuts.

The two plants possess a similar vegetation, but the Bambarra ground nut forms its fruits around the principal stalk, and does not possess trailing branches. It produces a bunch of upright leaves, and the fruits are developed close around the stem, at a very small depth in the soil, so that they may be readily harvested by simply pulling up the bunch of leaves, when nearly all the nuts come out of the ground attached to the stalk. It is thus seen that the produce of the plant may be quickly collected; the speed of harvesting is also increased by the circumstance that even those nuts that are left behind, when the plant is pulled up, all remain at the same, very small, depth below the soil.

The "Kew Bulletin," 1906, p. 70, states that the fruit is very like that of the ground nut, but that it is shorter, and usually only contains one seed, at maturity. It possesses a prominent ridge which forms a further means of distinguishing it from the fruit of the ground nut. There is a faint network of ridges on the sides; the total length of the pod is about $\frac{3}{4}$ -in. The resemblances to the ground nut are more superficial than otherwise, for it belongs to a different tribe of the leguminous family, being much more closely allied to the haricot bean. "Der Tropenpflanzer," Vol. III., p. 170, describes the seeds as being almost spherical and of very varying but always very pronounced colours.

Cultivation.—Returning to the bulletin that has been already quoted, this states that the requirements for the cultivation of the Bambarra ground nut are the same as those for the ordinary ground nut. It is planted and harvested in the same seasons; it covers the soil well, and, as it only produces a bunch of upright leaves, it lends itself especially to cultivation between rows of sugar-cane. For this purpose, it is sown in small pockets, between the rows, at a distance of about 18 in. each way. In sowing, three or four seeds are put into each pocket, at a depth of about 1 in.

The nuts are collected when the leaves commence to dry up, or this may be done a little sooner if it is desired to consume them while still green. If they are required to provide seed, it is preferable to wait for a short time before harvesting them in order to permit of their ripening completely in the earth.

Yields.—The yields obtained from the Bambarra ground nut are at least equal to and generally greater than those from the ordinary ground nut. When cultivated between every other cane row, in the way described above, 960 kilos of green nuts and 1,120 kilos of green leaves have been obtained per arpent (1'043 acres). The undried (green) nuts, when harvested thoroughly ripe, only lose 50 per cent. of their weight on drying; whereas if they are dug a little before they attain maturity they give scarcely 40 per cent. of dry nuts.

Storage.—If it has to be kept for any time, it is naturally necessary to permit the nut to ripen completely in the air and to dry it in the same way as is done for the ordinary ground nut. It keeps well when it is dry, and is not attacked in storage by insects, as far as has been observed in Mauritius.

Composition.—The following is the percentage composition of the green nuts, the ripe nuts, and of the entire fruit found at the Station Agronomique, Mauritius:—

	GREEN.			RIPE.		
	Nuts.	Shells.	Entire Fruits.	Nuts.	Shells.	Entire Fruits.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Water	45'40	17'96	63'36	10'27	2'00	12'27
Ash	1'28	0'18	1'46	3'23	0'71	3'94
Cellulose	2'35	1'23	3'58	4'63	5'23	9'86
Fats	2'41	0'02	2'43	5'03	0'14	5'17
Sugar and Starch	20'49	2'66	23'15	46'80	8'60	55'40
Albuminoids	5'67	0'35	6'02	12'04	1'32	13'36

The following table shows the composition of the leaves. Although the quantity of them produced is less than that from the ground nut, they contain a proportionately greater amount of nitrogenous matter. When they are allowed to dry as harvested, their nutritive value is lessened; they form, however, an excellent manure. In the table, the percentage composition of the leaves is given, both on the fresh and dry matter, and after these have been dried at 100 degrees C. :—

	ORDINARY.		DRIED AT 100° C.	
	Fresh Leaves.	Dry Leaves.	Fresh Leaves.	Dry Leaves.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Water	66'00	10'76	...	...
Ash	3'32	7'30	9'77	8'19
Cellulose	10'35	42'20	30'43	47'28
Fats	1'45	2'42	4'25	2'71
Sugar and Starch	14'63	31'41	46'05	35'20
Albuminoids	4'25	5'91	12'50	6'62

In a general way, if the mineral composition of the two plants is compared, it is found that, for the same crop from each, the Bambarra ground nut contains a little less phosphoric acid than the ordinary one; its content of potash is, however, much greater, so that the former plant is much more exacting in this respect than the latter. Lastly, the nitrogen content of the

ordinary ground nut is greater than that of the plant which is at present receiving special consideration.

Nutritive Value.—In the table which follows, the composition of the Bambarra ground nut is compared with those of rice, maize, lentils, and cassava, the figures being expressed as percentages:—

	BAMBARRA GROUND NUT.		RICE.	MAIZE.	LENTILS.	CASSAVA.
	Green.	Ripe.				
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Water	56·90	13·30	11·53	14·40	12·95	59·88
Ash	1·73	3·54	0·78	1·50	2·69	0·89
Cellulose... ..	2·41	4·37	0·35	5·50	3·67	1·28
Fats	3·14	6·94	0·48	6·50	0·60	0·19
Sugar and Starch	27·40	55·81	79·57	62·10	58·06	36·36
Albuminoids	8·42	16·04	7·29	10·00	22·03	1·40

It is an interesting fact that the composition of the Bambarra ground nut very closely approaches that of an ordinary normal food ration. Even alone, it constitutes a complete food, so that, unlike the others, it does not, from this point of view, require mixing with additional foodstuffs, in order that it may present the chief food bodies in proper amounts. Balland was almost the first to point out that the seeds of this plant form a food of this kind, and such as is capable of repairing the losses undergone in the animal body, without the addition of any other kind of nourishment. It serves as food best when it is not quite ripe—that is to say, when the covering has not become completely dry.

Uses.—Most of the uses of the plant have been indicated already. They include the employment of the nut for food, both for human beings and stock; the use of the leaves as fodder; and the provision by them, either when fresh or dry, of a green manure.

When the seed is cooked before it is ripe, it gives a starchy, nitrogenous vegetable, which is much liked, possessing as it does a very agreeable taste somewhat like that of the chestnut. When it is ripe and dry, it may be cooked in the same way as beans and lentils; it does not contain, however, as high a percentage of proteids as these foods. When ground, it yields a very white meal from which excellent broth and many soups may be made. Where the fruits are produced in large numbers, they may be used as food for stock; in this case, the fact that the covering is consumed as well as the seed gives the product an additional nutritive value.

Seeds of this plant have been obtained by the Department (Barbados) from the Station Agronomique, Mauritius, and are now being distributed for trial among the experiment stations in the West Indies.

OIL FROM RUBBER SEEDS.

At a recent meeting of the United Planters' Association of South India, Mr. R. D. Anstead mentioned that a large number of Pará rubber trees planted in that country are already beginning to bear seed, and each year more will do so. It has been estimated that trees after the fifth year will yield 500 seeds each, and the product of 400 trees will weigh a ton. It is stated that the seeds contain about 20 per cent. of an oil which has been valued at 100 dollars (gold) per ton. Mr. Anstead was of opinion that the planters should gather

the seed, crush it for the oil, and use the residue for fertilising the rubber plantations.—“The India Rubber World,” Vol. XLIII., p. 16.

“The comparisons of rubber seed with linseed and cotton seed have led to inquiries as to the possible commercial utilisation of rubber seeds in the future. At present there is such a demand for seeds for planting that there is no surplus supply. The Botanic Gardens at Singapore—which is really the birthplace of the Malay rubber industry—have already furnished great quantities of seed for the plantations; but the authorities now refuse to undertake any more orders for seed before next spring owing to the engagements already booked. But the time will not be long in arriving when there will be a large surplus of seeds from the 90,000,000 trees already planted. Scientific investigation of the rubber seeds has proved that they yield a fine clear oil of good drying quality. It has recently been suggested that, having in view the future commercial value of the seeds, it would be wise in erecting new machinery on plantations to make provision for power and space for seed-crushing machines. By doing so, the residue from the crushers, which is valuable both as cattle food and for fertilising, would be left on the estates.”—“The Chemist and Druggist,” Vol. LXXVII., p. 63.

We understand that there is just now rising a strong demand for oil of Pará rubber seed in the United States of America. The failure of the linseed crops, and the substitution of the cultivation of the soy bean for the linseed by many planters, has left the consumer of this oil short, and this is probably the cause of the interest now taken in rubber-seed oil.

Reports and notes on this oil have been already published in the Bulletin, but in the days when the attention of planters was called to this product all seeds were required for further planting, and since then the production of the rubber has been naturally the sole objective of the planter, who has not bothered about the minor product.

Now, seed is abundant, and it would doubtless be possible to bring this product into the market, and so to add to the profits of the estates. In clean weeded estates it should not be difficult for women and children to collect large quantities of seed at a cheap rate, they being paid by results. The seed could be shipped to the oil-mills, and there sold.

[Only lately a merchant was inquiring where a few tons of the oil were to be had for shipment to America, and it is certain that the oil would fetch a ready sale were it procurable in large quantities, especially at the present time.—Ed.]

Para Rubber-seed Oil.

(*Extracts from “Chemist and Druggist.”*)

Attention is again called to this article of future commerce in several papers owing to the shortage of linseed oil this year. The amount of rubber seed in the Peninsula now practically wasted is very large, and some addition to the profit of the industry might certainly be made from the seeds. On clean weeded estates, in the season, it should be possible to gather or sweep up the seed at a comparatively small cost and supply it to the oil-mills, where it could be crushed and the oil extracted, the residue being made into oil-cake.

The great scarcity of linseed oil is causing much anxiety among consumers. The paint trade has been making a large use of substitutes; but for wagon sheet-making, oilcloths, &c., nothing can take the place of linseed. The present quotation for linseed is higher than it has been for twenty years, and 100 per cent. higher than this time last year. The failure of the linseed crop and the occupation of many of the mills in soy bean-crushing seem to be the cause of this rise in price (extract from “Chemist and Druggist,” 1st October, 1910). Now it seems would be the time to put Pará seed oil on the market as a substitute for linseed.

SUGAR CROP OF 1910.

The Government Statistician, Mr. Thornhill Weedon, has compiled the following advance statement, showing the estimated result of the sugar crop for the present, or rather now, the past season, in comparison with the actual figures for 1909. The crop of 1910 will probably show an increase of 72,756 tons over that of 1909. The figures are as follows:—

		Acres Crushed.	Tons Cane.	Tons Sugar at 94. Net litre.
No. 1 Division.				
Estimate for 1910	...	26,705	466,810	57,827
Actual for 1909	...	23,728	380,770	47,225
Increase for 1910	...	2,977	86,040	10,602
No. 2 Division.				
Estimate for 1910	...	34,487	662,905	75,113
Actual for 1909	...	27,081	424,762	50,942
Increase for 1910	...	7,406	238,143	24,171
No. 3 Division.				
Estimate for 1910	...	34,454	610,139	66,641
Actual for 1909	...	27,035	329,852	33,771
Increase for 1910	...	7,419	280,287	32,870
No. 4 Division.				
Estimate for 1910	...	3,988	78,927	7,759
Actual for 1909	...	2,251	28,185	2,646
Increase for 1910	...	1,737	50,742	5,113
The Whole State.				
Estimate for 1910	...	99,634	1,818,781	207,340
Actual for 1909	...	80,095	1,163,569	134,584
Increase for 1910	...	19,539	655,212	72,756

A small quantity of cane in 1909 was crushed in New South Wales.

THE CANE BORER.

The cane borer has for years been a scourge to the sugar planters in most sugar-growing countries, and entomologists have striven for years in vain to find a parasite for its destruction. There was one thing, amongst many, which struck the editor of this journal, when he travelled on the coast lands and inland districts of the southern portion of Papua—that everywhere the sugar-cane looked healthy; no borers, nor grubs, nor gumming, nor rust being apparent. There are, as yet, no sugar plantations in Papua, but in all the native gardens a considerable amount of cane is grown for eating and for festival purposes, the latter running to a height of 30 ft., propped up by saplings; but nowhere was any disease seen. The banks of the Kemp Welch River, about 30 miles from Port Moresby, are lined with

wild sugar-cane, but none appeared to be diseased. The secret of this has, it would appear, been solved by Mr. Muir, Entomologist of the Hawaiian Sugar Planters' Experiment Station, who has lately returned from New Guinea, where, under great difficulties, he has been searching for over two years for the desired parasite. That he has at last been eminently successful in his arduous undertaking (and only those who have travelled in Papua, perforce on foot, know how arduous is the work) is shown in a letter addressed to the special correspondent in Hawaii of the "Louisiana Planter," to the following effect:—"It is believed that the wilds of New Guinea have yielded a parasite that will sound the death-knell of the cane borer which has caused so much loss to the sugar plantations of Hawaii. F. Muir, the Entomologist of the Hawaiian Sugar Planters' Experiment Station, returned this week from New Guinea with a fly, and it will be propagated immediately and tried out. Muir has searched for the parasite for over two years, and at one time was on his way home with the parasite when he was taken sick *en voyage*, and his specimens succumbed. He returned to New Guinea, however, and this time his mission was an entire success.

"The experiments so far made indicate complete success, and no time will be lost in propagating the parasite in large quantities. It is expected that the securing of a parasite for the cane borer will prove to be as notable an achievement for the interest of Hawaii's sugar industry as was the discovery of the parasite that resulted in the annihilation of the leaf hopper which threatened destruction to the plantations.

Muir's attempts to secure the parasites have involved hazardous travels in little frequented parts of New Guinea.

"The experts of the Hawaiian Sugar Planters' Experiment Station believe that the value of the successful importation of the parasite cannot be over-estimated, for it solves the only vital problem that has confronted the industry from a pest standpoint for some time. It is believed that failure or success in connection with the importation of the parasite will be known in the near future."

RAT EXTERMINATION.

The question of how to get rid of rats on a sugar plantation dates from the earliest days of sugar-growing in Queensland. We owned a plantation on the Pimpama River in 1870, and the rats were practically the only enemy we had to contend with. Year after year it was the same. They would gnaw their way right up the stalks, and quantities were destroyed every season. To this day the pest exists, and we have received numerous letters asking for a remedy. "The Australian Sugar Journal" of the 12th January gives the experience of a cane-grower on the Johnstone River, which we publish in this issue for the benefit of such growers who may overlook the article in the above journal:—

Experience on the Johnstone.

The following is an account of my experience in dealing with the rat pest in the cane fields, and its extermination by simple and inexpensive methods:—

When I first leased my cane farm, some seventeen years ago, it was one of the most rat-infested holdings on the Goondi Estate, especially that portion of it bordering the Johnstone River. So overrun was this particular portion with the vermin that, out of two successive cane crops harvested therefrom, it would have been well nigh impossible to discover a single stalk of cane untouched. It became very evident to me that, unless I waged a successful war against the pest, I would not find cane-growing profitable. Consequently I commenced poisoning, using various methods, and in the end I was successful. My farm is now practically free of the pest, and has been so for many years, but the process of finding out the most effective way of

exterminating the rats, though now apparently simple enough, was a long and tedious one, involving a good deal of time and expense. This, however, can, I feel sure, be obviated to a very considerable extent by those who desire to profit by my experience.

In the first place, I was recommended by the chemist then in charge of the Goondi Mill to use rice boiled and mixed with arsenic. This I found, owing to our moist climate, went mouldy very quickly. In any case it proved a failure, as the rats refused to touch it.

Sometime afterwards, Mr. Tryon, when visiting the district, advised me to try corn soaked in water mixed with a solution of strychnine. The rats, however, did not take to the corn so treated, and this method of poisoning them also proved quite unsuccessful.

Later on, Dr. Maxwell, during his first visit to the Johnstone, advised me to make baits of oatmeal and molasses, mixed with arsenic, and place them near the rat-eaten cane. The rats did not take kindly to these baits, and, though a few of them were eaten or partially so, no dead rats were found, nor was any diminution of cane destruction noticeable.

Then I tried small pieces of meat and bananas cut into each of which I put a dose of arsenic. Although many of these baits were taken, the results did not appear to be fatal to the rats, and the destruction of the cane went on as rapidly as ever. To satisfy my curiosity, I trapped two rats alive, and fed them on arsenic baits. They sickened a good deal at first, but eventually recovered; and no further feeding on arsenic baits appeared to make any impression on them. Such was not only my experience, but also that of my neighbour, Mr. Molle, who was at the time conducting similar experiments. I therefore have no confidence whatever in arsenic as a poison for our cane rats.

As a result of repeated trials and experiments for the destruction of rats, I find the most effective poison—in fact, the only effective poison for the purpose—is strychnine; and the food chosen to mix it with should be that which the rats have hitherto been living on. For instance, where patches of bananas, or even only odd banana plants exist, it will invariably be found that the rats in the vicinity will readily eat bananas poisoned with strychnine, and they will under similar conditions take baits made out of sweet potatoes or of cane.

It is practically useless to poison rats (especially with cane baits) when they are revelling in acres of sweet cane. The time to poison with advantage is immediately after each canfield is cut and burnt off, when poisoned cane will be found most effective. A farmer can always procure a stalk or two of cane elsewhere for the purpose, or reserve a stool of his own cane. In the case of a crop of young plant cane, a few baits should be distributed as a precaution before actual signs of the pest are seen. Generally speaking, the period for poisoning is from Christmas to, say, April or May.

The utmost vigilance is necessary to detect the first signs of destruction, which, when observed, should without loss of time be met by a plentiful distribution of baits.

I have found the most effective way of applying the strychnine as follows:—This poison as sold is too large in the grain, and should be ground as fine as possible. For this purpose an earthenware jar and a round-headed bolt will be found suitable. After grinding, place the poison in a small tin, the lid of which should be perforated with very small holes, all of which must be made within a circle of about the size of a shilling. This will prevent the powdered strychnine from spreading too much when shaken out. The bananas used for poisoning should be neither too ripe nor too green, and in a similar condition to those used for ordinary consumption. If the banana is of medium size, cut it in two; if large, cut it into three sections. Then cut each section lengthways, without cutting the back skin, lay a number of the split sections, with their backs on, say, a newspaper, and shake the strychnine tin over each one. Then close the sections carefully together, and place them in a billycan ready for distribution.

I generally make up from 50 to 100 of these baits at a time.

In the case of cane being used for baits, take a piece of cane 4 or 5 in. in length, split it down lengthways into either two or three sections, according to its size, and pepper the strychnine over the inside of each section, then close and press the sections into their original positions, and so place them carefully in the can ready for putting out in the canefield.

Sweet potatoes can be used for baits in much the same way. The composition of either the banana, sweet potato, or sugar-cane is such as will readily absorb the strychnine, and this will be assisted by pressing the sections together as advised. It is absolutely essential, before preparing the baits, that a drop of essence of aniseed should be put on the hands of the person making up the baits, and another drop should be again used similarly just before distributing them. The aniseed not only does away with the smell of the hand from the bait, but has a strong attractive smell for the rats.

I may here state that, a few days after distributing for the first time bananas poisoned with strychnine in the canefield bordering the Johnstone River previously referred to, I revisited the field and the smell of the dead rats was very pronounced; but to me it was a most welcome smell.

When the cane baits are placed out in the field, the sections should be separated, and each one laid on its back, so that the rats can more easily gnaw them.

Many farmers, while deploring the destruction of their cane by rats, take no steps to exterminate the pest. Such a course of action or want of action must lead to ruin, especially should cane injured by rats be sold by individual analysis—a position which may be brought about any season by the C.S.R. Company's cane-growers under the terms of their cane agreement.

If the pest is to be properly stamp'd out, concerted action on the part of the owners of rat-infested farms is very necessary. It is certainly not encouraging for any one farmer to poison rats on his farm if his neighbours continue to breed him a fresh supply.

No cane-grower can object on the score of expense to poisoning on the lines here laid down. All that is required is a 1-oz. bottle of strychnine, costing, say, 5s., and one of aniseed, 1s. Both should last quite a whole season, even on a badly rat-infested farm. The food forming the baits costs really nothing, and can be made always available. There is also the time taken in preparing and distributing the baits, which would amount to about two hours, say, twice a week for a few weeks of the year—a cheap process surely, and one which, if carried out systematically by each grower, will, I feel confident, speedily lead to the extermination of the pest.

I omitted to mention earlier that some three years ago the Commissioner of Public Health, Dr. Ham, through his inspector, Mr. Dudley, inaugurated in this district a series of experiments for poisoning rats with a rat-virus and with a phosphorous paste. Generally speaking, the results were not successful.

I will shortly recapitulate the chief essential measures to be adopted for the destruction of the rat pest by strychnine poison:—

Use for poisoning the food the rats are used to.

Poison at the time of the year when the cane is not ripe.

Concerted action on the part of the growers is necessary to eradicate the pest, and the poisoning operations should be carried out systematically and intelligently.

Never forget to use the aniseed.

Keep clean all headlands. This will make the baits placed there more observable and more accessible to the rats.

"The Palms," Innisfail.

C. E. JODRELL.

P.S.—The rats causing the bulk of the destruction of the cane in the North are of several species, said to be indigenous. The house rat, however, lends a willing hand, or rather tooth, at the game.—C.E.J.

PROFITABLE TOBACCO-GROWING.

By R. S. NEVILL, Instructor in Tobacco Culture.

To the question, "Is the growing of heavy export tobaccos profitable, or can Queensland growers compete with other countries in other markets?" the answer is,—Yes, if the farmers are willing to adopt modern methods, and conduct their farming operations upon lines followed by other agricultural communities. Not only that, but they can practically monopolise the market for this class of tobacco in these States, as it is conceded that, so far, this State gives promise of being able to produce the best tobacco grown in Australia. Given the soil and a sufficient rainfall, the cost of production in this State should be less than it is in the United States, for the following reasons:—The Queensland farmer does not require to feed his working stock through a long hard winter, his taxes are little more than half those imposed on the farmer in the United States, and he gets a larger yield than the latter, while the price of labour is about the same.

Ordinarily, the amount of tobacco produced here is not commensurate with the labour performed, and for the reason that the labour is often not properly directed.

It is doubtful if any one crop, to the exclusion of all others, can be made profitable one year with another, employing only one-third or one-half of a man's time, and the balance idle or doing wage work when he can get it. By diversifying the crops of the farm, and making tobacco one of the crops, the farmer does not then depend upon the one crop for the whole of his income and sustenance, and he is sure to get a good price for one or more of his products, besides producing his own food, which he can do cheaper than he can buy it out of his tobacco money.

There is now a demand for something like 2,500,000 lb. of Queensland pipe tobacco; and this can readily be increased to 5,500,000 lb. if the farmers will try to meet the demands of the trade. Our manufacturers have shown both liberality and enterprise in their efforts to foster this industry; and it is now up to the farmers to meet this with an effort to produce exactly what the trade demands. At present we are only producing something like 500,000 lb.—a material increase over a few years ago, but still not rapid enough to keep pace with the demand. There is plenty of suitable land, in Inglewood and Texas districts, to be had at a moderate price.

Methods.

It goes without saying that the one-crop system requires a higher average of prices to be more profitable than that of several crops. By diversifying their crops, the farmers of the United States have found tobacco-growing fairly profitable at 3½d. per lb.

The cost of production in Queensland can be materially lessened by substituting the plough for the hoe, as I have heretofore suggested—a process which will increase the quantity and improve the quality. Improved curing-sheds and improved methods of curing will also give additional weight to the tobacco, besides improving its quality. The labour of transplanting can be much lessened by a thorough preparation of the ground beforehand, by deep ploughing and deeper cross-ploughing, and thorough harrowing, and getting the soil into the best of tilth. By this means a proper arrangement of soil particles is obtained, and the land is in the best physical condition, influencing beneficially both the temperature and the moisture; the free access of air is secured, supplying the necessary amount of oxygen, and the soil is in such a condition of fineness as to allow a perfect root development.

These are all essential to healthy plant life; and when these conditions exist, the farmer will have fewer plants dying from transplanting, and the labour will be materially lessened. It should be evident to everyone that

the soil, in such condition as to supply, fully, all that plant life demands of it, will give the best results in every particular, and this condition cannot be obtained without the free use of the plough.

Use of the Plough.

A cloddy soil will certainly defeat all efforts to get a good and uniform stand in the field, and care should be taken to plough the ground when it is in proper condition. A tobacco-field should be ploughed after each hard rain—after the ground has sufficiently dried, until the plant is too large. When the plants are kept in a perfectly healthy and vigorous condition, they are less susceptible to disease. Priming, or taking off the bottom leaves in order to allow ventilation under the plant, is also a condition to healthy fields. The amount of water in the soil to produce the best results for heavy pipe tobaccos is estimated to be from 15 to 20 per cent.

"Below 15 per cent. the line of drought is reached, and the methods of cultivation should have for their prime object the maintenance of the water supply above the line of drought, so that the growth of the plant shall receive no check."—*Whitney*.

The growing of cigar tobacco is profitable whenever a good quality can be produced, as the supply of good cigar-wrapper is always limited and prices good. The questions of cheap labour and cost of transportation need not greatly concern the grower of this class of tobacco.

Such tobacco can be grown in the North of Queensland at about 6d. per lb., and should be *profitable*.

Product.

It is important that growers should take notice of these things, for when they seek an outlet for the surplus product they must offer an article quite as good as others, and one which is produced as cheaply. This cannot be done unless the best methods are adopted—the best are the most economical.

The appreciation of the necessity of proper methods, and their adoption, will save fully 25 per cent. of labour, besides giving better and increased results.

The various pests of the tobacco plant can be controlled by the use of Paris green as a spray, but this must not be used after the tobacco has been topped. It is very effective in the case of the Miner.

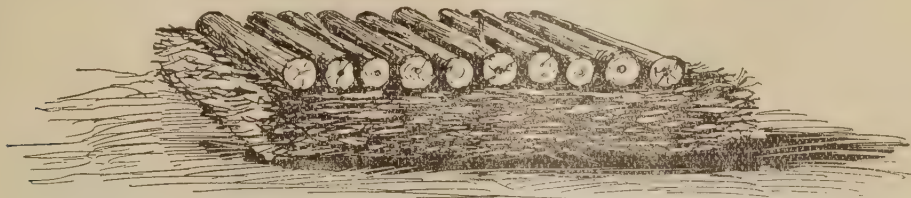
The lands best suited to growing heavy export or pipe tobaccos are friable and well drained. Limestone soils, with a small percentage of clay and a large percentage of silt, are the best. Wet or forcing soils will not grow good tobacco, as the product will be rank and woody.

Climate has much to do with the quality, and this can only be determined by experiment. For cigar tobacco sandy soils are preferred, some of the best cigar lands of Florida having 50 per cent. of sand. This is confirmed by Mr. Whitney in his report on the tobacco soils of the United States.

PREPARATION OF PLANT BEDS.

I wish to say in the beginning that improved methods do not imply more labour, but they do imply more painstaking. It means the taking advantage of favourable conditions or creating conditions that are needed, and, more than all, it means the getting of exact results; leaving nothing to chance. It is not necessary to give the many reasons suggested to show that plant beds well burned give the best results, except to say that it destroys the vegetable and insect life, and permits the plants to occupy the entire soil undisturbed. Select for your seed bed fresh land on a hill slope, where it will not be shaded, and near water not subject to overflow, as the land will be moist and need less watering. Dark soil is to be preferred, as it absorbs a greater degree of heat.

Clear the ground of undergrowth and stone, and then put on a layer of brush and leaves to the thickness of 2 ft. or 3 ft.; and then on top of that put wood and logs, covering it well over, so that when it is burned off it will leave a heavy bed of coals.



The ground should be burned until it is a red or brick-dust colour, in order to destroy all seeds and insect life, and so as to completely pulverise. Do not burn when the ground is wet. When it has cooled, rake off all unburned wood, but allow the ashes to remain on the bed, and then spade it up to the depth of 6 in., being careful to reverse the soil. It should then be well chopped with a hoe, and raked until the ground is thoroughly pulverised and the ashes well mixed with the soil, all sticks, roots, and stones being removed.

Do not make the beds too narrow, as they will get too dry; 6 ft. is a very good width, but they may be as long as desired. Sow a teaspoonful of seed to 35 square yards of ground; this will make the plants thick enough; as that quantity of seed will yield 12,000 to 15,000 plants. A teaspoonful will hold from 18,000 to 20,000 seed, and a yield of 75 per cent. is as much as the best seed will give. It is better to have the plants too thin on the bed than too thick, as crowded plants grow weak and spindly, having no strength to overcome changed conditions; and when transplanted many of them die. They do not start to grow readily, and are more subject to the ravages of cut-worms and other pests, causing many missing plants, making your field very irregular in growth, and entailing much extra work in topping and cutting, as the field ripens irregularly. But if your plants are thin they grew stocky, with good roots, and are strong and healthy growers, requiring less moisture when transplanted. They grow off readily, soon getting out of the way of pests, and you have a more uniform field at topping and at cutting time.

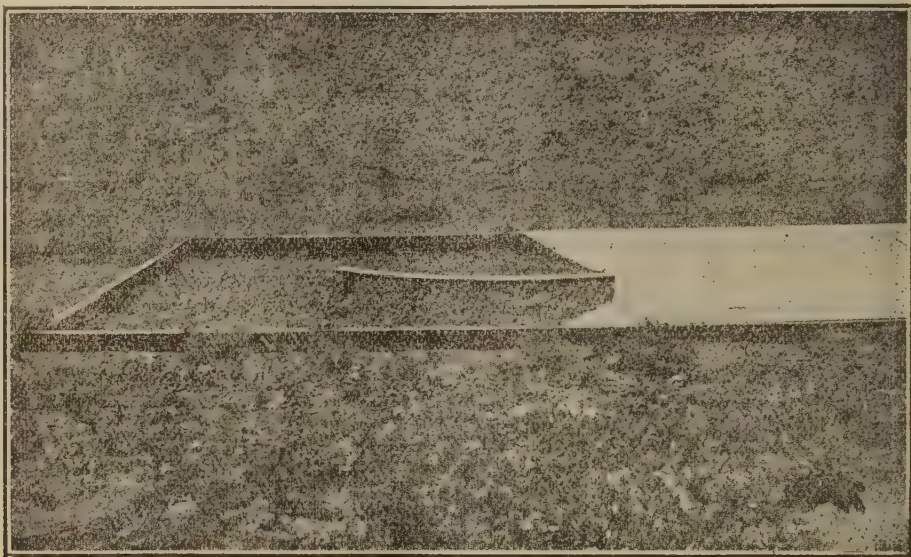
If you desire to test the vitality of your seed before sowing, take a few in your fingers and sprinkle them on a hot stove. If they are good, they will pop and crackle; but, if not, they will burn and crumble away. When ready to sow your seeds, mix them with cornmeal or slacked lime, as this will show on the bed, and you can see what you are doing. After sowing do not rake, but tramp or pat in the seed with the back of a spade.

Before sowing, it is well to pour your seed into a glass of water and let them soak 6 or 8 hours, or over night, in order that all of the best seed may sink to the bottom of the glass. Then pour off what does not sink and throw away; only sow those that have gone to the bottom, for these will be the largest, soundest, and healthiest; and it has been shown by experiment that the strong vital seeds give the best results, both in yield and quality; or, if it is preferred, they may be winnowed with a palm-leaf fan, blowing away the light and chaffy seed.

After soaking, put the seeds from the bottom of the glass in the sun and let them dry off, and then prepare them for sowing.

Do not sow all your seed at once, but at intervals of two weeks, that you may have plants of the proper size for transplanting when wanted; sow more than you are likely to need, that you may be able to select the strongest and best plants. In order to keep your plants free from disease and insects, and to get the very best results, it is necessary to canvas your beds. Take boards and set them on edge all around the bed, driving stakes on either side to keep them in place, and thus form a box around it, closing the joints with earth so as to make them insect-proof. The boards should come 5 or 6 in.

above the top of the bed. Drive a row of nails on the outside of the box, 10 or 12 in. apart, all around, leaving 1 in. projecting; have a sheet made, of the thinnest cheese cloth, the size of the bed, with holes around the edges to correspond with the nails driven into the box; stretch this sheet over the bed, slipping the holes in the edges over the nails. If the bed is large, lay small poles across the box frame at short distances, to keep the covering from sagging. Be sure to get the very thinnest cloth, that light and air may penetrate.



This covering usually stays on all the time until the bed is abandoned; but watch your plants, and, if they do not appear strong and healthy, you can remove the covering during the heat of the day, say from 11 to 3 o'clock, when insects are not moving about. Make a ditch around the bed to carry off the water during rainy weather. If it is necessary at any time to water the plants, it should be done about sundown, the covering laid off, and, as soon as the watering is finished, replaced.

It is best to draw the water for this purpose in the forenoon, and let it stand in the sun and get warm, as cold water chills both the plants and the soil. It will be found that a canvas-covered bed retains the moisture better than any other, and also induces a more uniform temperature.

If you desire to fertilise the plants, it is best to use liquid manure, either stable or chicken-house—the latter preferred on account of the lime in it; and care should be taken not to have it too strong, or it will burn the plants. To make the liquid, take a barrel of water, put in the manure, and stir until dissolved. If the farmer will follow the above directions, he will have healthy vigorous plants that will stand transplanting, will grow off readily, and be free from insects. He will have a start ahead of the insects, and will find that he will get his crop to grow with less labour.

A VALUABLE APPLE.

An apple, which is supposed to be the largest grown in England this year, was recently sold by public auction at Covent Garden. The apple was a Gloria Mundi; its weight being 27 oz.; its circumference, 16½ in.; and its height, 5 in.; and it was grown by the King's Acre Fruit Tree Nurseries at Hereford. Bidding for the apple began at 1 guinea, and it was eventually sold for £14, the proceeds going to the Charing Cross Hospital.

The Orchard.

PRESERVING FRUIT ON THE FARM.

By CHARLES ROSS, Instructor in Fruit Culture.

I have often been appealed to, when visiting the various shows where bottled fruits have been exhibited, as to the best and most economical methods of preserving fruits. In preparing the following article, in as concise a form as possible without marring its clearness, I have endeavoured to help those who are desirous of preparing the fruit products of the farm for home use:—

Preserving is nothing more than sterilising the fruit in vessels that can be hermetically air-sealed. Each glass jar (if such be used), with its contents, is submitted to the action of heat for a sufficient length of time to permit the necessary temperature to penetrate the receptacles and the heart of the fruit. Every particle of the contents to the very centre must be heated at a temperature of 170 degrees Fahr., at which temperature all ferments are killed. Some products are more easily penetrated than others; and the operator, by a little experience, will easily determine this and "process" accordingly—*i.e.*, the vessels must be left in the hot bath for a longer or shorter time. It is not only necessary that the liquid contained in the jars should reach 170 degrees, but it must become heated to such a degree as to transmit this temperature to the fruit; consequently, it will take more time for the heat to reach the inside of large fruit than that of the smaller ones. The processing will be increased if the fruit contains stones or the texture of the flesh is very firm. Should the liquid be a heavy syrup, the processing will be further increased.

All fresh fruit contains the germs of decomposition, but the application of the necessary heat kills the germs and arrests decomposition. Not only is the fruit and liquid sterilised, but a vacuum is formed in consequence of the air being driven out or absorbed. So long as this vacuum is effectively maintained, the fruit will retain its natural freshness and flavour.

On the State farms where the writer was manager, Mrs. Ross attained a high degree of success in preserving fruits both in light and heavy syrups as well as in pure water. After much experimenting, the following mode of procedure was adopted:—

The appliances used were a good-sized cooking kettle or copper with a flat bottom; a suitable basket or tray made with a wooden bottom and wire netting sides, to fit the boiler; a bath thermometer registering up to 240 degrees Fahr.; a small centrifugal saccharometer for testing the density of syrups; an enamelled pan for boiling syrup; a wooden spoon for stirring; and a pitting spoon. The latter may be made by sharpening the edges of an ordinary teaspoon.

Preparing the Fruit.

Apricots.—As apricots are bottled with their skins on, no specked or imperfect fruit must be used. Make a clean cut, all round, down to the stone, and with both hands give the fruit a firm twist without bruising, and it will divide in two halves. Remove the stone, paring off any loose or ragged pieces, and pack immediately, with the skin side uppermost, into sterilised jars. Shake the fruit down by striking the bottle on the table. Fill fairly tight, and pour in the syrup to the brim.

Pears.—Pears should be full flavoured (but not soft or over-ripe) and evenly graded. Peel them lengthwise; remove the stalks, cut in halves, and take out the cores with a pitting spoon. Carefully pack into the bottles round

side uppermost, and fill up with syrup. If the cores are not removed, the flat sides may face the glass, which gives a pretty effect.

Peaches.—The fruit should be even in size, fully developed, but firm. Halve the fruit in the same manner as apricots, remove the stone (if cling-stone) with a pitting spoon, and pare away the ragged fibre in the cavity. Each half is peeled with a sharp, thin knife separately.

Plums.—Choose the best varieties; grade into sizes, avoiding undeveloped and over-ripe fruit. Prick each fruit with a copper needle (steel will discolour) to prevent cracking, wipe dry, and pack close without crushing. Then fill the bottles with syrup. In the case of freestone plums, the pricking should penetrate to the stone to allow the air to escape from the surrounding cavity.

The following precautions should be observed:—Avoid exposing the fruit to the air after it is cut or peeled, and handle as little as possible to prevent discolouring. If peeled fruit is to remain long before bottling, immerse it in a brine bath strong enough to float a potato. The brine will not affect the flavour, so the fruit need not be washed or wiped after brining, but it should be drained. A bath made of 1 oz. of sulphite of soda to 6 gallons of water is antiseptic, and has a whitening effect.

Cherries, as well as some varieties of plums, are liable to crack when processing, and should be punctured with copper pins.

Any of the above fruits may be preserved whole for exhibition, &c., but for household purposes dissected fruit is more economical.

Syrup.

A syrup of 30 per cent. density was generally used on the State farms for all fruits—*i.e.*, 3 lb. of sugar to the gallon of water. An extra heavy syrup of 60 per cent., or 6 lb. to the gallon, may be used for those who prefer highly sweetened foods; or a 10 per cent. syrup—1 lb. to the gallon—for pie fruits. The strength of the syrup does not materially matter for preserving. The saccharometer should be used to ensure a regular density.

A little more water than is required is poured into an enamelled pan and brought to a boil; the sugar is then added and gently stirred, whilst the simmering is kept up for about 7 minutes. Care must be taken not to let it scorch, and that the scum be removed as it appears. When the syrup is cooked, strain it through muslin and allow it to cool. If the syrup is not used the same day, it should be again sterilised.

To Process the Fruit.

When everything is ready, put sufficient water to completely cover the bottles into the copper, boiler, or kerosene tin, or whatever vessel is used for the bath, and suspend the thermometer in the water. Whilst the water is heating, place the rings and lids on the bottles. If the rings are good, they will not be injured by the heat. The bottles are now packed in the basket; and when the thermometer in the bath reaches 130 degrees Fahr., immerse the basket and its contents in the water. At this heat the water will not enter the bottles (the latter being quite full) and mix with the syrup, or *vice versa*, as would happen if the water were cold; neither are the jars likely to crack. When the temperature reaches 160 degrees Fahr., begin to note the time for the necessary processing.

No hard-and-fast rule can be laid down for times and temperatures, which must be left to the discretion of the preserver. Conditions of ripeness, variety, and size of fruit are to be taken into consideration. The following directions may be taken as reliable:—

Immerse the bottles in the water at a temperature of 130 degrees Fahr. Count the time in every case from 160 degrees Fahr., and preserve small fruits for 10 to 12 minutes, the thermometer not registering at any time more

than 180 degrees or 190 degrees Fahr. Process large fruits for 10 to 17 minutes. Hard fruits, such as cooking pears or quinces, require somewhat more heat and longer "process." Apples, on the other hand, require less. The softer the condition of the fruit, the less heat and a longer process are required. A little practical experience will determine the right temperature. The basket is then lifted from the bath, and the lids should at once be screwed or clamped down very tightly. The jars are then stood on a wooden floor with a piece of hessian spread over it, and the whole is covered with another cloth to prevent the bottles cooling too quickly. A cold floor or cold draught of air might have the effect of cracking them. When cold, the jars are cleaned, labelled, and stored in a dark, cool place.

When home-made bottled fruits are to be supplied to the stores for retailing, the syrup should be made of a higher density than for home use. The stores will take large quantities of these home-bottled fruits at remunerative rates; and the more attractively they are put up, the greater will be the demand.

MILDEW ON GRAPE VINES AND ROSES.

At the December competition of the Charters Towers Horticultural Society, Mr. E. Mann, who won the third half-yearly medal of the society, read a most interesting paper on "Mildew on Grape Vines and Roses." Before reading his paper, he was asked the question if grape-vine roots were standing in water for a month or so, would it cause mildew? Mr. Mann replied, "Yes; unless the trees had a free circulation of sap, mildew would appear, and, on vines standing in water, the sap would only travel to the water, then stop, and thus there would be no circulation." Mr. Mann's paper was as follows:—

"Mildew is a disease of which little is known, even by experts, and remedies applied without due knowledge are often worse than useless, as they enfeeble the constitution of the plant, and so spread the disease in some cases more than they retard it. One fallacy I would point out, to start with, as on this mistake the crux of the whole matter rests. It has been stated even by Government experts, here on the Towers, that rain causes mildew. This is one of the half-truths that are worse than a downright lie, as I firmly believe that water, judiciously applied, is the best remedy we have against mildew; and amateurs, imbued with the above idea, are apt to fight shy of water as a remedy, and wander on the dust-heap of ignorance in consequence.

My first knowledge of mildew was gained in Oxfordshire. A schoolmaster put up a rough vinery, with an old-fashioned brick flue in it, and tried to grow grapes. The vines were planted inside the glass house, but the roots grew both inside and out. When I first knew it, the schoolmaster was bothered with mildew, and tried to get rid of it by keeping the inside of the house dry. He never had any grapes. He afterwards moved, and my brother took over the vinery from him. The first year after, he had a few grapes, and the second year he had a good average crop, and mildew was almost eradicated. His plan was to shut up all the ventilators about one hour before sunset and slop water all over the floor, also syringing the vines overhead; if the days were cold and sunless, he lit a fire in the flue to create a steam, and the place was something like a Turkish bath; he also used sulphur liberally, but water was the first remedy.

My first experience was with a clematis; I was looking after a small lean-to greenhouse, with three vines in it, the clematis being on the back wall. I wanted the clematis away, but the lady who owned the place fancied it, and it had to remain, needless to say. I was only 18 at the time. I neglected the plant a good deal, and one day I noticed spots of mildew on the vines, then I noticed the clematis covered with it. I also remembered I had

given it no water for about a week. Well, I adopted the foregoing plan, only, having hot-water pipes in this case. I dusted sulphur on them, and took extra care to well water the clematis, its roots being all inside. I stopped the mildew at once, but the clematis was ruined for the season, as all the leaves fell off, a few leaves on the vines became full of holes where the spots of mildew had been, but I replaced a few of the worst by fresh grown ones, so they were little the worse for my first experience; but I had learned my lesson.

In England—a cold damp climate compared with ours—I hardly ever saw mildew on plants out of doors, and never saw flowers and fruit destroyed with it as they are here, where we have an exceptionally dry climate, so you can understand, with my experience, I am very sceptical when anyone talks of rain causing mildew.

My belief is, that mildew is not a primary disease at all, but a secondary one—that is to say, plants are not attacked by mildew when in good health, but only when their constitution is enfeebled by other causes. I would here point out to you that climbing plants are the most subject to mildew; they are generally given to rambling as much under ground as above. This is because in their natural state they gain support from other plants, and must, of necessity, go beyond the roots of their host to gain their food, or both would languish. It follows, also, that a climbing plant must be exceptionally hardy, or have a very low standard of vitality, to enable it to live alongside of other plants, before its roots can spread beyond the radius occupied by its host. This is very noticeable in roses and grape vines, as they can often be seen in neglected gardens making an effort to live, long after all other plants have vanished. Take a plant with a high standard of vitality—say a snapdragon—and plant it alongside a rose, grow them along till they both appear good healthy plants, then stop watering them, and let them go. The snapdragon will droop, and die too, before the rose shows much sign of distress. When the snapdragon is in good health, its higher vitality and free flow of sap sets mildew at defiance; and if it ever gets so low in vitality as to give the mildew a chance, it dies. Not so the climbing plant; the casual observer sees nothing wrong with it, although it is suffering from just the same cause as the snapdragon, but the mildew soon finds suitable breeding-ground, and, if he has eyes to see, shows the cultivator what is amiss.

Grape vines and rose trees are planted here, much the same as they are planted in England, without any regard to the change of climate. In England, they are fed up with manure to such an extent that the rose, according to nature, becomes a sexless monstrosity, refusing to reproduce its species, and has to be starved back again before it performs its natural functions; here we feed it just the same, and with our warmer, drier atmosphere, where the evaporation is so much greater, the elaborated sap becomes too rich to circulate freely. It is just this congested, sluggish state of the sap vessels that offer the best breeding-ground to mildew.

The reason why people get the idea that rain causes mildew is this: When grape vines start to grow in spring, the weather is just perfect for them, but as the summer advances it gets hotter, the plants get more foliage, and evaporation increases; the root action is stimulated to try and keep pace with the demand for sap, and the roots travel far and wide, far beyond the limits of the artificial watering in some cases, and they manage to keep going all right till the stoning period. This is when the grapes are half-grown, and they seem to be at a standstill for a week or two. This is when the greatest strain comes on the plant; when the overtaxed roots are unable to keep the leaves fully supplied with sap, then comes the mildew. But if we get a shower, as we generally do about this time, the evaporation is checked, and, if the rain is fairly heavy, the roots get a plentiful supply of water; and this causes reaction. The leaves are now inadequate to elaborate the sap sent

along to them, root growth is stopped, and all the energies of the plant go to forming new leaves to make the best use of the sap coming along. In moister climates this would not matter so much, but in our dry climate it is disastrous, as we have no subsoil moisture. After the rain, the sun shines again, and evaporation is increased by the extra foliage to such an extent that the roots soon exhaust all extra moisture in the soil, and are back on their old supply with the extra foliage evaporation going on. Then the mildew spreads rapidly, and at the first thought it does appear that the rain caused the mildew, but, as I have shown several cultivators here, mildew comes about the stoning period, whether it rains or no. So rain does not cause mildew—it only accelerates the spread of the disease under these circumstances; but, if cultivators would only assist their plants by spraying the ground in the middle of the day for a few days after rain, they would help them considerably to resist the disease.

I believe we could beat the mildew easily by growing our grapes on overhead trellises 7 ft. from the ground. This at least would reduce the temperature at the leaf by 20 degrees; we would also have the stem partly shaded by its own foliage, and the 7 ft. of clear stem could easily be painted with a strong solution of mildew destroyer. I prefer sulphur myself. The ground would also be partly shaded by foliage and easily worked, while the evaporation from the soil would pass through the foliage above and lessen that of the leaves, also lowering the temperature—still further a great help in our hot climate. Water should be used sparingly at the start, but as the vines progress it is difficult to give them too much in this climate. Particular care should be taken at the stoning period to see they have plenty; and at this time spraying the ground at midday would help them. Always spray the ground after rain too, to prevent sudden change. If a little bone manure was used during showery weather, it would probably assist the plants in forming foliage that would better resist evaporation.

Our nurserymen are rapidly weeding out roses subject to mildew, and, as there are now plenty of all colours fairly mildew proof, it is best to discard mildewed plants altogether; but where you get a touch of it, see first if the soil is moist, not only on the surface, but right down as far as the roots are likely to go. Dryness at the root is the most frequent cause of the complaint. Having seen to this, spray the plant in the middle of the day, and dust a little sulphur on the ground round it.

There are many more experiments I would like to make on this subject; but directly I get any mildew in my place and start to experiment it vanishes, and I am not too sure whether my remedy or the weather has effected it.

In conclusion, I say sulphur is the best external remedy for mildew I know. But when a plant is badly infested, the only remedy is to induce a free circulation of sap in the plant; and this can only be done with water.

THE CALIFORNIAN RAISIN INDUSTRY.

We have received from Mr. George Robertson, Fresno County Statistician, California, the "Statistical Summary of the Californian Raisin Industry," which contains some points worth noting by those engaged in raisin-making in this and in the Southern States. Queensland, as far as this industry is concerned, may be looked upon as a negligible quantity, as, all told, there are only about 1,700 acres of bearing grapes in the State, and this area will doubtless be greatly curtailed, owing to the arrival of the *Phylloxera vastatrix* at Enoggera. Certainly the strongest measures are being taken to combat the enemy, but, as, unfortunately, at one period of its existence it is winged, there is no telling where the pest will stop.

As far as wine and raisin making are concerned, Queensland has very little to boast of now that interstate duty on wine has been abolished. About 90,000 gallons of wine are now annually made by 387 winemakers, and, as for raisins, only a few are made experimentally.

California is essentially a grape-producing country. In 1873 her crop of raisins amounted to 120,000 lb., and she imported 35,271,312 lb. No exports are recorded until 1898, when the raisin output was 80,000,000 lb., and 3,109,639 lb. were exported. In 1903, the crop rose to 120,000,000 lb., and 4,280,028 lb. exported; but 6,715,675 lb. were imported. In 1909 140,000,000 lb. of raisins were made, of which 7,880,161 lb. were exported and 5,794,320 lb. imported. The raisin crop of 1910 was 112,000,000 lb., but we have as yet no record of exports or imports; the former will probably exceed the latter by very little, as the crop fell 28,000,000 lb. below the previous year's record.

Australia and Canada are the best customers for Californian raisins, Canada taking, in 1909, 6,374,222 lb., and Australia and New Zealand 1,165,954 lb.; South America takes 32,253 lb.; Asia, 201,756 lb.; Europe, 100,000 lb.; and Africa, 5,896 lb.

As far as production of raisins and currants is concerned in Australia, Victoria produces 7,788,032 lb.; South Australia, 3,136,784 lb. of raisins; and the currant crop in Victoria amounted, in 1908-9, to 1,336,048 lb., and in South Australia to 2,738,288 lb.

New South Wales, Queensland, and Western Australia also produce small quantities of both raisins and currants.

CITRUS TREES.

This month, from what we hear, there will be a considerable addition made to the area under citrus fruits, especially in the Southern and Central districts. Intending growers will, therefore, be well advised to carefully study the directions for planting and for the subsequent treatment of the young trees published by the Instructor in Fruit Culture to the Department of Agriculture and Stock, and at the same time not to neglect good advice from outside sources from which many good "wrinkles" may be gathered. Here is one hint, for instance, by Mr. E. L. Koethen in the "Fruit World":—

Question.—What if newly planted trees settle down and are found not to be straight after they are planted and irrigated?

Answer.—It will be necessary to follow up the planting the day after the trees are planted and straighten them up. This can be easily done, by making a small wedge-shaped hole beside the tree on the side from which the tree leans, and then with the back of the spade shove the tree over enough to straighten it up. Then the soil should be packed nicely into the loose side so as to prevent its settling back again.

Question.—How soon do you irrigate after planting?

Answer.—In about ten days or two weeks.

Question.—How often do you irrigate citrus orchards?

Answer.—That depends upon the age of the tree, and the nature of the soil; also, upon the season to some extent. A very hot spell may hasten the time for applying water. As a rule, a newly-planted orchard should be irrigated every two weeks the first year in dry sections. After that the time may be lengthened out to four weeks or six weeks. With well-established trees we prefer the longer period if all the conditions are favourable. Never allow an orchard to wilt. This applies especially to the early months of the year.

Question.—How many furrows do you make?

Answer.—Many growers make but one on each side of the trees, the first season. I believe it is better practice to keep the whole space moist from the start. This will encourage the roots to forage over the entire surface sooner, and hence a greater food supply and a consequent greater growth.

Some soils are such that the water percolates much more freely than in others. For this reason in some soils four furrows will be sufficient, while in others from five to six are considered necessary. The fewer the better if the maximum amount of soil is moistened.

Question.—Is a wet surface evidence of good irrigation?

Answer.—Not necessarily. It may be evidence of a very bad state of affairs. Some soils always wet up to the surface, but good irrigation consists in getting the water into the soil, and not on top of it. The evaporation from a wet surface is enormous, and if the operator can avoid it he should.

Question.—How can he do this?

Answer.—The first requisite is to have deep cultivation in order that the furrower may make deep furrows. In that case the water percolates from the depth of the deep furrow, and starting low is not so apt to travel up in the loose soil by capillarity. By making the furrows wide apart, there is a space between furrows which while wet underneath the surface is not saturated at the top. Light sandy soils are more easily handled in this respect than heavy ones.

Question.—What pruning does the tree need the first year?

Answer.—We will presume that the trees have been headed low. That is, say 18 in. from the collar. This strip of trunk should be kept free of branches. If possible, the crown should be so built that acute angles are avoided. In order to do this, the branches should leave the main stem at different heights; 3 in. to 4 in. is best. Three branches is a good number. Further than this but little will be needed.

Question.—What pruning will be needed the second year?

Answer.—All so-called suckers on the main trunk should be kept off. Further than this, there is a difference of opinion among growers as to the best method to pursue. One has a system by which all rank woody growth is kept down, and the tree is kept in such shape that it will practically never require propping. This system makes a close-headed tree, of stalky habit, and it is claimed for it that it is less likely to run to the production of coarse fruit.

Another grower represents the other system. He encourages all the growth the trees will make, trusting to Nature to fill out the open spaces and the weight of the limbs, when they begin to bear, to open up the tops to let the sunlight in. I personally prefer this system. The advantages are, larger trees at less expense; open tops that give good bearing surface inside and out, and a free and natural growth.

HIGH PRICES FOR PIGS.

Berkshire pigs have been selling well at auctions in Illinois and Kansas of late. At Gregory Farm, Whitehall, Illinois, 44 sows averaged £33, and 4 young boars averaged £16; 1 sow, Masterpiece's Handsome Lady 3rd, sold for £79. At Aurora, Illinois, 50 sows and gilts averaged £20. At Lawrence, Kansas, 35 averaged £17 10s.

Science.

PURIFICATION OF BRACKISH WATER.

Most settlers close to the coast in Queensland, and also in many inland districts, have experienced the trouble of brackish water. In some cases the water is so brackish that stock, unless exceedingly thirsty, will refuse to drink it. We find, however, that, as the result of many experiments made on such waters by Mr. Kelway Bamber, of Selangor, Straits Settlements, what appears to be an absolute corrective of the waters passing through saline muds and peaty soils, such as abound on our coasts, has been found. Mr. Bamber has published the results of his very useful work in the December (1910) issue of the "Agricultural Bulletin of the Straits and Federated Malay States." These results we publish, as they cannot fail to be of the greatest interest to owners of stock or farmers and fruit-growers on whose land the water supply is brackish. Following is Mr. Bamber's letter to the abovementioned journal:—

Re brackish water from Selangor muds, I had some sent over of the worst kind to make some experiments regarding its purification for drinking and manufacturing purposes. I enclose the analysis. The water was sour, brackish, muddy, and with a strong smell of decomposing organic and sulphur compounds.

Lime water produced an immediate curdy precipitate which settled clear in a few minutes, but the water still had some smell.

Alum solution caused a similar precipitate even more rapidly, and the water cleared at once; but the smell was intensified and the water was still very acid.

Permanganate of potash also caused a bulky precipitate; and if sufficient was added the smell in twenty-four hours practically disappeared; but this alone would be too expensive.

I then found that a mixture of lime water, alum, and permanganate of potash gave a clear water with little or no smell and quite capable of being used for rubber manufacture or for drinking, the cost being only about 23 cents per 1,000 gallons.

The method to adopt should be to dig settling tanks in one of the main drains passing near the factory site. These should be about 50 ft. long and 14 ft. wide by 6 ft. deep, and can be dug along the drain at intervals of 50 ft. or so. Two-thirds full, they would each hold 17,500 gallons, and they would require—

- 12 lb. quicklime stirred up in cold water;
- 34 lb. alum;
- $\frac{1}{2}$ lb. permanganate of potash.

Brackish Wells.

The cost of these would be about 4s. 2d., or, say, 4 dollars on the estate.

There should be wooden doors across the drain above and below the first and last settling tank, which could be closed, if necessary, after rain to keep the tanks full.

The lime water should then be sprayed over the tank, followed by the alum solution, the water being stirred to cause even admixture.

Finally, the permanganate solution can be sprayed on as uniformly as possible after the bulk of the precipitate has settled.

If the pink colour produced by the last salt disappears rapidly, more permanganate should be added until the water remains pink for at least half an hour.

The water will then settle clear and practically free from odour, and can be pumped to the factory from the nearest tank.

The drain between the settling tanks can be the same depth as the tanks, so that all the water can be uniformly treated.

Similar tanks can be dug in other drains about the estate to provide clear water for tapping and washing purposes.

For drinking purposes the water can be boiled in addition, but, if the right amount of permanganate is added, it is not absolutely necessary.

The quantity of lime added should be sufficient to neutralise the acidity, and can be increased with impunity, as a hard water will probably be found to give better results in the factory.

I thought perhaps you would like to publish this regarding brackish water for the benefit of estates on the ordinary Selangor alluvial soils:—

Water from Lapan Utan Rubber Company, Limited.

Parts per 100,000.

Total solids	...	...	...	...	...	42'000
Chlorine	...	...	...	...	...	15'000
Free ammonia	...	...	...	...	...	0'040
Albuminoid ammonia	...	...	...	...	...	0'150
Nitrates and nitrites	...	...	...	...	...	2'000
Nitrites	...	...	...	...	...	Present

I certify that this water is so polluted as to be unfit for human consumption.

Statistics.

COMMONWEALTH METEOROLOGY.

RAINFALL OF QUEENSLAND.

TABLE SHOWING THE TOTAL RAINFALL FOR EACH MONTH OF THE YEAR IN THE AGRICULTURAL DISTRICTS OF QUEENSLAND.

STATIONS.	1909.	1910.											
	Dec.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
<i>North.</i>													
Bowen	19'98	15'45	7'10	21'45	5'26	0'18	2'23	0'58	0'18	3'75	0'30	3'89	5'36
Cairns	15'24	21'80	17'12	24'16	16'18	3'51	6'59	Nil	3'59	1'34	1'67	7'27	11'59
Geraldton	19'98	20'35	34'57	33'74	24'57	11'90	19'35	1'34	7'42	11'51	3'18	7'30	4'77
Gindie State Farm	...	...	...	...	...	...	2'65	1'45	Nil	...	...	...	...
Herberton	5'11	16'64	12'21	12'40	3'50	1'85	1'70	Nil	0'88	0'58	0'43	4'93	9'71
Hughenden	8'01	4'52	3'59	2'95	0'30	0'41	0'85	0'48	Nil	2'75	1'57	3'41	1'13
Kamerunga State Nurs.	...	...	...	...	...	...	Nil	...	3'39	...	2'06	...	...
Mackay	25'56	35'28	9'73	24'31	6'18	3'73	5'70	1'1	0'48	4'32	0'7	2'67	2'15
Mossman	...	...	...	...	...	...	...	...	1'91	2'90	3'17	10'36	...
Rockhampton	2'74	11'93	1'28	19'84	0'61	0'59	5'98	1'67	0'23	1'62	0'99	4'17	2'46
Townsville	11'51	23'07	10'88	17'21	2'29	0'26	1'05	0'33	0'3	3'34	0'11	2'53	6'77
<i>South.</i>													
Biggenden State Farm	6'96	7'22	3'99	3'82	0'73	1'06	5'25	0'92	0'28	...	2'36	4'59	5'96
Brisbane	6'45	7'24	4'19	6'42	1'22	0'43	6'74	0'39	...	2'72	3'27	2'49	13'99
Bundaberg	2'99	11'81	2'43	8'92	0'31	0'19	6'17	2'10	0'16	2'33	0'70	8'39	1'58
Dalby	2'45	10'88	1'33	3'87	Nil	Nil	6'06	1'42	0'64	2'11	3'96	4'09	3'29
Esk	9'20	8'60	1'94	6'09	1'19	0'27	4'74	0'58	0'23	4'65	3'41	3'84	7'53
Gatton Agric. College	3'92	11'79	...	3'68	0'69	0'61	5'05	1'99	0'60	...	3'60	2'85	6'84
Gympie	16'54	5'92	3'48	7'74	1'13	0'22	5'57	0'83	0'32	1'54	2'90	3'16	1'96
Ipswich	4'72	6'91	2'78	3'56	1'65	0'20	3'74	1'67	0'58	1'55	3'70	1'96	5'04
Maryborough	6'83	5'65	2'99	3'92	1'72	0'64	4'89	1'09	0'35	1'22	1'53	4'19	3'19
Roma	1'05	4'74	1'47	8'36	0'15	0'4	5'71	1'24	Nil	0'46	3'64	4'39	0'96
Roma State Farm	...	...	...	...	...	...	...	...	...	0'38	2'95	3'50	7'97
Tewantin	8'85	5'96	3'42	15'18	6'30	1'31	15'08	0'76	1'34	1'52	3'17	7'71	8'25
Warren State Farm	...	...	...	...	...	...	1'88	...	...	...	0'45	...	...
Warwick	4'25	3'93	3'14	2'57	0'68	0'55	3'16	1'82	0'54	1'39	2'20	3'86	3'46
" Hermitage State Farm	...	...	...	...	...	...	...	1'73	0'39	...	...	...	...
Westbrook State Farm	...	...	...	...	...	...	2'77	...	...	...	2'98	...	4'44
Yandina	20'18	6'71	2'07	11'81	3'26	0'40	13'13	0'70	0'15	0'88	3'34	5'16	16'05

NOTE.—The rainfall data in this table are compiled from telegraphic reports, and must be considered as approximate only.

GEORGE G. BOND, Divisional Officer.

Sericulture.

SILK CULTURE IN CEYLON.

From the fifty-second progress report of the Ceylon Agricultural Society, of which Mr. C. Drieberg is secretary, we learn that the question of handing over the Peradeniya Silk Farm to be worked by the Salvation Army, which has peculiar facilities for pushing sericulture as a village industry, has been decided by the silk committee, with the approval of the finance committee. The offer of a decremental grant of Rs. 2,000 for the first year, Rs. 1,000 for the second, Rs. 500 for the third—after which the grant will cease—is considered satisfactory by Commissioner Booth Tucker, who, writing from Simla on 1st November, says:—"I am hopeful that within the period mentioned we should be able to get the farm on a self-supporting basis." He adds further: "I should like, however, to point out that, in the interests of Ceylon itself, what appears to me to be wanted is a silk school, which will train young men to establish the industry throughout the island, acting as sericultural inspectors, and going from village to village with a view to introducing the cultivation amongst the people. This is much more important than the creation of a commercially successful farm—(1) The people must be taught the benefits of the industry, and must be trained in the correct methods; (2) precautions must be taken to avoid the diseases which have sometimes devastated the industry in other countries. I should propose, therefore, that a few scholarships be given to young men, in order to induce them to come and study the business for a period of from three to six months, the instruction to cover the following five branches:—

- (1) The hatching of eggs and rearing of silkworms for production of cocoons, with improved methods of rearing and feeding.
 - (2) Grainage, also the production of indigenous disease-free seed for distribution: In France and Italy the rearers of silkworms are not allowed to produce their own seed, this being an entirely distinct business.
 - (3) Silkworm food: The best varieties of mulberry, castor, &c.
 - (4) The diseases of silkworms and their remedies: Microscopic examination on the Pasteur system.
 - (5) Reeling silk: As modern machinery is expensive, it will be necessary to make use for the present of improved hand-reeling devices. A little later on a proper filature will be established."
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General Notes.

"PATTERSON'S CURSE."

At the monthly meeting of the Kyeamba (Wagga) Shire Council a sheaf of letters was read from landholders calling attention to the need for taking action to prevent the spread of the plant known as "Patterson's Curse." Mr. McMicking wrote that it was already proclaimed a noxious weed in the shires of Coreen and Tumbarumba, and by Albury Municipal Council; but he thought it would be impossible to take that course in the Hume Shire, as it had obtained such a hold that eradication might have a very serious consequence. It was decided to take steps to have the plant declared a noxious weed, and to ask neighbouring shires to co-operate in the movement.—
"Farmer and Settler."

VARIATION IN BUTTER FAT.

Concerning the difference between the legal standard of butter fat in the morning and evening milkings, Mr. O'Callaghan, nearly two years ago, made exhaustive tests during the month of July at the State farm, near Berry, New South Wales, and showed that the butter fat varied greatly in the several herds, the tests being taken during the month of July, 1908. On the morning's milk, eight Holsteins returned 2.90 per cent. of butter fat; an Ayrshire, 2.86 per cent.; and a Shorthorn, 3.45 per cent.; six Guernseys giving 3.77 per cent.; while the Jerseys gave 4.70 per cent. The evening's milk showed a much better result, the lowest test being that of the Ayrshire (3.81 per cent.), and the highest that of the Jerseys (5.16 per cent.). But the fact remains that, in a pedigree herd of undoubted quality, the legal standard was not maintained at both morning and evening milkings.

Answers to Correspondents.

BANANAS NOT BEARING.

FARMER, Mirani, Mackay—

Mr. C. Ross, Instructor in Fruit Culture, in reply to your letter of 13th December last, remarks that you have not stated what variety of banana you planted, nor have you described the soil, subsoil, drainage, &c. His opinion is that plants 4 years old only 5 feet high indicate poverty of soil. None but sound, healthy suckers or bulbs from stools in full bearing should be planted, in the first place; but there are so many contingencies operating against successful banana culture that he would require to see the plantation before giving conclusive advice. Mechanical texture in natural conditions of soil and subsoil, aspect, drainage, moisture, rainfall, temperature, &c., all require very close attention.

JAPANESE MILLET AS A FODDER FOR SHEEP.

E.S.W., Bunya, Jondaryan—

It is pretty certain that Japanese millet, like other fodders of the same family, contain, at their earliest stages of growth, a poisonous acid yielding glucoside.

BROOM MILLET.

"Millet," Nanango—

In reply to your inquiry *re* millet-growing, Mr. D. Jones, Redbank, has furnished the following reply:—"Suckers, as a rule, do not develop on good varieties of millet. However, should they appear, they had better be removed as they will restrict the growth of the brush. If working ratoon or second crop the whole field will be suckers or shoots from the original stalks. Broom corn, as it is best to designate it in contra-distinction to other fodder millets, can be made with proper cultivation to yield two crops from one sowing. An early spring crop can be put in, which matures in from three to four months; the stalks then can be cut down either by mowing machine or other implement; the second crop maturing in about three months. The second-crop brush is not so valuable as the first; but quite merchantable. A machine to hack the brush can be made by driving nails through inch battens, then fastening the same on a cylinder made of pine log or similar material; drive bearings in at the ends; rest on standards; turn as you would thrasher, &c. If cog wheel can be utilised to give extra speed, using gear motion, so much the better. This might be attached to pony gear or other power, as hand operation is both slow and very unpleasant work. Sometimes a hand saw is used held between two clefts, and brush drawn with pressure over the teeth; also a cleft stick is driven into the ground, the brush drawn through the cleft, a constricting pressure used with one hand while pulling the head through with the other. The last two methods are very primitive; for large quantities a power machine is required. There is no machine on the Brisbane market made expressly for this purpose. Any ordinary bush hay press will serve for baling the brush; any handy man can construct a rough one, adapted for the purpose, built up of a few logs and other timber. Brisbane buyers: Sloan Bros., Albert street; Blind Asylum, Ipswich road; J. Stoddart, Market street; Mr. Chamberlain, Stanley street, Brisbane. Broom corn, to be profitably grown, needs, above all, a good machine for removing seed. American growers, by utilising labour-saving implements, can handle this crop in large areas and cheaply. Until the Queensland grower provides himself with up-to-date implements, so long will he be hampered in properly getting his crop harvested."

DESTROYING COUCH GRASS.

G. EBENSTON, Esq., Wyberba—

There is only one way of getting rid of couch grass in orchards and standing crops—*i.e.*, by cultivation. A shallow ploughing, succeeded by harrowing, will get rid of most of it; then deeper ploughing will do the rest; by continuing this course so long as any couch appears, it can be eradicated. If it should have grown into thick masses, as it often does, run the mowing machine over it first. You might try a plan which is said to have been very successful in England, and that is to sow 3 bushels of tares to the acre. The tares entirely killed the couch. All arsenical poisons are dangerous to trees, but there is an American preparation of copperas on the market in the United States which is said to be effective and not injurious to valuable plants, but nothing is said concerning its effect on fruit trees. See Journal, January, 1911, on "Spraying Weeds."

CANE GRUBS IN THE ISIS DISTRICT.

F. GORE-JONES, Knockroe, North Isis—

Mr. Hy. Tryon, Government Entomologist and Vegetable Pathologist, writes in answer to your questions on the cane grub:—

(1.) The grub when fully mature, and usually when about twelve months more or less old, constructs a small oval chamber in the soil, and, remaining stationary therein, transforms first to a pupa and then to a beetle.

(2.) The beetles, in suitable weather conditions, emerge from the soil, male and female individuals consorting together shortly after this event. Then, after having enjoyed a few days of aerial existence, the female insect repairs to the soil, and lays, just beneath the surface, small batches of eggs. On the other hand, should hot dry weather occur continuously when they are sufficiently advanced in maturity to emerge, this event does not take place, and they die in the soil.

(3.) Not having been in the Isis district at the time that the beetles are about, it is not practicable to indicate from personal observation the average numbers of eggs that a female beetle will lay. There are grounds, however, for concluding that this number will not be found to exceed two or three dozen.

(4.) It may be pointed out that the cane grub of South Queensland, or, at least, the more prevalent one, is not identical with any one of the kinds occurring in the cane fields from Mackay northwards.

The Markets.

PRICES OF FRUIT—TURBOT-STREET MARKETS.

Article.	DECEMBER.	
	Prices.	
Apples (American), per case	15s. to 16s.	
Apples (South Australia), per case	10s. to 12s.	
Apples (Cooking), per case	6s. to 8s.	
Apricots, per quarter-case	3s. 6d. to 6s.	
Bananas (Cavendish), per dozen	2d. to 3½d.	
Bananas (Sugar), per dozen	2d. to 2¾d.	
Cherries, per quarter-case	7s. to 9s.	
Grapes, per lb.	1½d. to 2d.	
Lemons (Italian), per case	13s. to 14s.	
Lemons (Sydney), per case	6s. to 8s.	
Mangoes, per case	5s. to 6s.	
Nectarines, per quarter-case	2s. 3d.	
Papaw Apples, per quarter-case	3s. to 5s.	
Passion Fruit, per case	2s. to 3s. 9d.	
Pineapples (Ripley), per dozen	8. to 1s. 3d.	
Pineapples (Rough), per dozen	6d. to 1s. 9d.	
Pineapples (Smooth), per dozen	2s. 6d. to 4s. 6d.	
Plums, per quarter-case	2s. to 4s. 6d.	
Peaches, per quarter-case	2s. to 3s. 6d.	
Rock melons, per dozen	1s. to 4s. 6d.	
Tomatoes, per quarter-case	1s. to 2s. 3d.	
Watermelons, per dozen	2s. to 6s. 6d.	

SOUTHERN FRUIT MARKET.

Apples (Local), choice, per case	9s. to 10s.
Apples (Jonathan), per case	16s.
Apples (Cooking), per case	4s. to 5s. 6d.
Apricots, per gin case	5s. to 7s.
Bananas (Queensland), per bunch	3s. to 5s.
Bananas (Queensland), per case	16s. to 17s.
Bananas (N. Queensland), per bunch	...
Bananas (Fiji), per bunch... ..	4s. to 5s.
Bananas, (Fiji), per case	10s. to 17s.
Cherries, per quarter-case... ..	8s. to 10s.
Cocoanuts, per dozen	2s. to 2s. 6d.
Gooseberries, per half-bushel case	4s. to 6s.
Grapes, per box	...
Lemons, per gin case	2s. 6d. to 5s.
Mandarins (Emperor), per case	12s. to 14s.
Mandarins (Queensland), Emperors, per gin case	...
Nectarines, per half-case	3s. to 6s.
Mangoes (Queensland), per packer	...
Oranges, per case	7s. to 12s.
Passion Fruit, per quarter-case	2s. 6d. to 3s.
Papaw Apples (Queensland), per bushel case	4s. to 5s.
Peanuts, per lb.	5½d.
Peaches, per half-case	4s. to 8s.
Pears, per gin case	2s. 6d. to 6s.
Pears, per half-case	7s. to 8s.
Pineapples (Queensland), common, per case	8s. to 9s.
Pineapples (Queensland), Ripley, per case	8s. to 9s.
Pineapples (Queensland), Queen's, per case	9s. to 10s.
Plums, per half-case	3s. to 5s.
Rockmelons, per dozen	5s. to 6s.
Strawberries, per three-quarter tray	2s. 6d. to 4s. 6d.
Tomatoes (Queensland), per quarter-case	1s. 6d. to 2s. 6d.
Watermelons (Queensland), per dozen	12s. to 16s.

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to 10s.
16s.
to 5s. 6d.
to 7s.
to 5s.
to 17s.

5s.
to 17s.
to 10s.
2s. 6d.
to 6s.

to 5s.
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to 3s.
5s.

8s.
to 6s.
8s.
9s.
9s.
10s.

5s.
6s.
4s. 6d.
2s. 6d.
16s.

Farm and Garden Notes for March.

FIELD.—Take every opportunity of turning up the ground in readiness for sowing and planting winter crops. The main crop of potatoes should at once be planted. As the growth of weeds will now be slackening off, lucerne may be sown on deeply-cultivated soil. The latter should be rich and friable, with a porous sub-soil. The land should be thoroughly pulverised. Do not waste time and money in trying to grow lucerne on land with a stiff, clay sub-soil. Prepare the land a couple of months before sowing, care being taken to cross-plough and harrow before the weeds have gone to seed. This ensures a clean field. Sow either broadcast or in drills. In the former case 20 lb. of seed will be required; in the latter, 10 lb. A good stand of lucerne has been obtained with less quantities. Lucerne seed is worth from £2 16s. to £3 5s. per cwt. Should weeds make their appearance before the plants have sent down their tap-roots, mow the field. Before they can again make headway enough to do any damage, the lucerne will be strong enough to hold its own against them. Harrow and roll the land after mowing. Gather all ripe corn. It is now too late to sow maize, even 90-day, with any certainty of harvesting a crop of grain. Rye grass, prairie grass, oats, barley (in some districts, wheat), sorghum, vetches, carrots, mangolds, and Swede turnips may be sown. In Northern Queensland, sow tobacco-seed, cow-pea, Carob beans, sweet potatoes, opium poppy, &c. Sow Anatto, Jack fruit, and plant Kola-nut cuttings. Some temperate zone vegetables may be planted—such as egg-plant, potatoes, &c. Coffee-planting may be continued. Harvest Kafir corn and paddy.

FLOWER GARDEN.—Now is the time to plant out bulbs. A complete garden could be furnished with these charming plants, which are to be had in every colour and variety. Amongst the many are—Amaryllis, anemone, arum, babiana, crinum, crocus, freesia, ranunculus, jonquils, iris, ixias, gladiolus, narcissus, Jacobean lilies, tigridia, tritonia.

All bulbs like well-drained somewhat sandy soil, with a plentiful admixture of leaf mould. Herbaceous plants and annuals which it is intended to raise from seed should be sown this month. Such are—Antirrhinums (snap-dragon), asters, cornflowers, dianthus, larkspurs, daisies, cosmos, candytuft, lupins, gaillardias, godetia, mignonette, poppies, pansies, phlox, sweet peas. Cannas now planted will require plenty of food, in the shape of liquid manure. Put in cuttings of carnations. Chrysanthemums require attention in the way of disbudding, staking, watering with liquid manure, &c. Growers for exhibition will thin out to a few buds, and protect the flowers from rain and sun. Dahlias should be looking well. To secure fine blooms, disbudding should be done.

Now, as to climbers which may now be planted. These are—Allamanda Schottii (beautiful yellow), Antigonon leptopus, a charming cerise-coloured climber; Aristolochia elegans, handsome as an orchid, and easily grown; Aristolochia ornithocephala (Dutchman's Pipe), very curious, large, always attracts attention; Asparagus plumosa, grows in any shady place; Beaumontia grandiflora, splendid white flower, grand for a fence, will grow 50 ft. high; Bignonias of several kinds; Bougainvilleas, with their splendid leafy pink and purple flowers, rapidly clothe a fence or unsightly shed with a blaze of blossom; Quisqualis indica, a fine creeper, flowers pink, changing to white; Wistaria, purple and white. Most beautiful is the Bauhinia scandens, rarely seen about Brisbane. We grew a plant of this climber at Nundah, and it soon closed in the front of the veranda for a distance of over 80 ft. The leaves are very small, and in the flowering season it presents almost a solid mass of

beautiful round bunches of blossom, something like the hawthorn bloom—pink and white. It seeds freely, but the seeds are difficult to germinate, and when they have produced a plant it is still more difficult to rear it. A rooted sucker from the main stem will, in all probability, grow.

KITCHEN GARDEN.—During this month a very large variety of vegetable seeds may be sown in readiness for planting out where necessary in the autumn, which begins on the 20th March. All unoccupied land should be roughly dug, and, where required, add well-decomposed manure. Transplant cabbage, cauliflower, celery, &c. Sow French beans, beet, carrot, turnips, radish, cabbage, cauliflower, cress, peas, mustard, &c. Former sowings should be thinned out and kept clear of weeds. Mulch round melon and cucumber beds with a good dressing of long stable manure, as it assists in keeping the fruit clean and free from damp. Cucumbers, melons, French beans, and tomatoes should be looked for every day and gathered, whether required or not, for if left on the vines to perfect their seeds the plants will soon cease to be productive, or will form inferior, ill-shaped, and hence unsaleable fruit.

Orchard Notes for March.

By ALBERT H. BENSON, M.R.A.C.

The Southern Coast Districts.

The marketing of the main crop of pineapples will continue to occupy the attention of growers; and as it is probable that the plantations have been allowed to get somewhat dirty during the previous month, they should be cleaned up as soon as ever the crop has been got off. The fruit of the new crop of citrus fruit will be showing signs of ripening towards the end of the month; and as the fruit during this period of its growth is very liable to the attack of insect pests of various kinds, it is important that steps should be taken to prevent loss arising from this cause as far as possible.

Large sucking moths of several kinds attack the fruit as soon as it shows signs of ripening; and as they always select the first fruit that shows signs of colouring, it is a good plan to gather a few forward fruit and to ripen them up quickly by placing them on a barn floor, and covering them up with bags or straw. They will turn colour in a few days, and develop the characteristic scent of the ripening fruit. The fruit so treated should be hung up in conspicuous places in the orchard as trap-fruit, as not only will it attract the moths, but also the fruit flies. The moths will be found clustered round the trap fruits in large numbers, and can then be easily be caught and destroyed. Fruit fly will also puncture such fruit; and if the fruit is destroyed before the larvæ reaches maturity, a later crop of these insects is prevented from hatching out. Fruit flies may also be caught in large numbers by means of such artificially-ripened fruits. The fruits are smeared with tangle-foot, and hung about the orchard. The fly, attracted by the colour, settles on the fruit, and is caught in a similar manner to house flies on specially-prepared sticky paper. These simple remedies, if carefully carried out, will result in the destruction of large numbers of sucking moths and fruit flies.

The yellow peach moth that does such damage to peaches in spring, and that attacks corn, sorghum, cotton bolls, custard apples, and many other plants and fruits, often does a lot of damage to citrus fruits. It acts in a very similar manner to the second and later generations of the Codling moth of pomaceous fruits, in that it lays its eggs where two fruits touch, under the shelter of a leaf on the fruit, at the stem end of the fruit, and, in the case of

navel oranges, in the navel itself; in fact, anywhere that there is a likelihood of the egg not being disturbed. The egg hatches out into a small spotted caterpillar, which eats its way into the fruit, causing it to ripen prematurely, and fall off. Where two fruits touch, it often eats into and destroys both, and it frequently leaves one fruit to go and destroy a second. It is a very difficult insect to deal with, owing to the number of fruits and plants on which it lives; but, as far as citrus fruits are concerned, the best remedy is undoubtedly to spray the fruit with a remedy that will destroy the young insect when it starts to eat the skin of the fruit. Bordeaux mixture has been found efficacious, but I am of opinion that spraying with Paris green and lime, Kedzie's mixture, or arsenite of lead will also have good results. The latter poison is, in my opinion, well worth giving a thorough test, as it sticks to the fruit and leaves for a long time. Bordeaux mixture, either alone or in conjunction with Paris green or Kedzie's mixture, is, however, a good remedy, as not only will it destroy the larvæ or prevent the moth from attacking the tree, but it is also the best remedy for black brand or melanose, as well as tending to keep all other fungus pests in check. Fight fruit fly systematically—both by means of the sticky fruit already recommended, and by gathering all fly-infested fruit, such as guavas, late mangoes, kumquats, &c., as well as any oranges or mandarins that may have been infested, as if kept in check now there will be little loss throughout the season. A little fruit will be marketed towards the end of the month. See that it is gathered and sweated for seven days before marketing, and don't gather it too immature. Beauty of Glen Retreat mandarins are often gathered and marketed as soon as they show signs of colouring. They are then as sour as a lemon, and anyone who is unlucky enough to buy them will steer off mandarins for some time to come. This variety should not be gathered till thoroughly ripe, as when marketed in an immature state it spoils the market, as it puts people off eating citrus fruit.

Clean up the orchard after the summer rains, and have everything ready for the marketing of the crop. See that there is a good supply of clean, dry, case timber on hand, as one of the greatest sources of loss in shipment is packing fruit in green cases.

Strawberry-planting can be done throughout the month. Plant such berries as Federation on the lowest ground, and Aurie, Anetta, Trollop's Victoria, Glenfield Beauty on warm, well-drained soils. Prepare the land thoroughly, so that it is in perfect tilth, and in a fit state to retain moisture well; as on this, as much as anything, the success of the crop depends. Where new orchards are to be planted, get the land ready—not the clearing, which should have been done months ago, but the working of the land, as it is advisable to get it thoroughly sweetened before putting the trees in.

The Tropical Coast Districts.

The Notes for February apply equally to March. See that bananas are netted—keep down weed growth, and market any sound citrus fruits. Clean up the orchards as well as possible, and keep pines clean. Get land ready where new orchards are to be set out, as tree-planting can be done during April and May. Pines and bananas can still be planted, as they will become well established before winter.

The Southern and Central Tablelands.

Finish the gathering of the later varieties of deciduous fruits, as well as grapes. Clean up the orchard, and get ready for winter. Get new land ready for planting; and where there are old, dead, or useless trees to be removed, dig them out, and leave the ground to sweeten, so that when a new tree is planted to replace them the ground will be in good order.

In the drier parts, where citrus trees are grown, keep the land well worked and water where necessary.

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NOTICE.**Queensland Agricultural Journal.**

It is hereby notified that the *Journal* will be supplied to all members of Agricultural and Horticultural Societies who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Schools of Arts will be supplied at the same rate.

Persons resident in Queensland whose main source of income is from Agricultural, Pastoral, or Horticultural pursuits, which fact should be stated on the attached Order Form, will receive the *Journal* free

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To all other persons the annual subscription will be 10s., which will include postage.

All remittances should be made by postal notes or money orders, but where they are unobtainable stamps will be accepted, though the Department accepts no responsibility for any loss due to the latter mode of remitting.

For your convenience an Order Form is attached. A cross on each side of the Order Form indicates to the recipient that his subscription is again due.

Amount of one year's subscription should therefore be forwarded with Order Form, without delay, to the UNDER SECRETARY, Department of Agriculture and Stock, Brisbane.

All subscriptions received for the *Journal* after the seventh day of the month will commence with the month after that on which payment is received. Previous copies available will be supplied at 6d. per copy.

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SHOW DATES FOR 1911.

WONDAI.—Wondai Agricultural, Pastoral, and Industrial Society. The first show of the above society will be held at Wondai on 10th and 11th May next.

GAYNDAH.—The dates for the forthcoming show of the Gayndah Pastoral, Industrial, Agricultural, and Horticultural Association have been changed to 6th and 7th June.

It is notified that Mr. E. S. Innes has been appointed secretary to the Blackbutt Farmers' Progress Association, *vice* Mr. John Dreghorn.

The above reached us too late for insertion in the list of Agricultural and Horticultural Societies.

Agriculture.

THE CULTIVATION OF OUR HEAVY BLACK SOILS.

By D. MACPHERSON, Manager, Biggenden State Farm.

There is no soil that more absolutely requires to be worked in with the weather than our heavy black, and as we cannot regulate the weather, we must, to be successful, do all that is humanly possible to be ready for whatever weather we get, which is only another way of saying that we must have our cultivation well ahead.

It is useless to calculate that we have so many days ahead of us, and that if we plough a given number of acres every day we will get through in time, for rain may knock a week or a month or even more out of the time we counted on, as it is impossible to work black soil while it is wet, and unwise to work it even on the wet side.

To keep the cultivation of black soil well ahead means more power in proportion to the area than is generally allowed; in order that when the land is in condition for working, a large amount of work can be got through quickly, and land that is in condition for ploughing not left a day longer unploughed than is absolutely necessary.

Breaking the land out of grass may be done while the ground is rather wet, as it is less strain on horses and implements, and as the horses walk on the turf no damage is done. Breaking up should only be deep enough to turn over the surface turf, the cross-ploughing being somewhat deeper.

It is generally disappointing to attempt to grow maize, sorghum, &c., on virgin black soil, particularly on that that has been growing spear grass; and where practicable it is as well to let it lie fallow for a season, or to sow wheat or oats on it, and allow the stock to graze them off. The next working will, with favouring weather, give a good return.

On old land, the removal of one crop should be followed as quickly as possible by the plough, as it will be found that in dry weather the ground is more easily ploughed immediately the crop comes off than even a week later.

Many stop ploughing because the ground is too hard, but that is really the best time to plough. Ploughs can be got that will go into the ground no matter how hard it may be, and the rest is simply a matter of horse power.

Having broken up the land, it should lie undisturbed, and the rougher the better, until rain falls, when, if it has been ploughed dry, the clods will fall or melt, and a stroke of the harrows will put the land in order for the second ploughing. Generally speaking, a month or six weeks should elapse between the first and second ploughings, and it is as well to get on with this second ploughing as soon after this as possible, as the longer the land lies after the second ploughing, before seeding, provided the piece is kept clear of weeds, the better will the prospect of the crop be.

After the second ploughing the ground should again be left in the rough, and if it dries out completely so much the better; it will then absorb the first rain that falls, like a sponge, and when dry enough, should be given a stroke

with the light harrows, followed, if the weather keeps fine, by the disc or spring-tooth harrows; and these should be kept going at intervals till seeding time, to conserve moisture and keep down weeds.

In making the last ploughing some time before seeding, there is the risk of heavy rain leaching the soil, or the land getting overrun with weeds, should continuous rains set in; but the leaching is only serious when land is prepared for February to April planting, and has to lie bare through our wettest months; and if we want to plant in these months, we have little alternative, as if the land is not ploughed before the wet season sets in, there is little chance of its being ploughed through it.

As for weeds: If the weed seeds are in the land, and the rains sufficiently continuous to prevent surface cultivation, the piece must get out of hand; but one is then no worse off than if the ground were not ploughed, as the same rain would prevent ploughing, while if a proper rotation is used, it will be found possible to keep the land intended for February to March sowings at least fairly free from weed seeds.

Owing to the deficiency of humus in black soil, it is desirable to return as much humus-producing material to it as possible. Burning off should only be resorted to when unavoidable, and green manure crops, rubbish, weeds, &c., ploughed in when at all practicable.

The selection of ploughs for a black soil farm is of the very first importance. A disc plough for turning under rubbish, green manure crops, &c., is almost an essential, and comes in very useful for especially deep ploughing, or if, as is unfortunately sometimes the case, the ground must be worked rather on the wet side. Disc ploughs are, however, not much use when the black soil is dry and hard, nor are they good implements for getting rid of couch.

The mould-board plough should be the mainstay of the black soil farm. I do not mean the light Yankee implement that is so often seen idle "because the land is too hard for it," but a good strong double-furrow that will work with three good horses when the land is in good order, and at any time by adding to the horse power, and will get over an appreciable amount of work in the day, without the necessity of having a first-class ploughman behind it.

BROOM MILLET.

We have had frequent inquiries from intending planters of broom millet as to a market for the fibre and the market price. Latterly the supply has been quite unequal to the demand, and prices have risen accordingly until buyers are willing to pay £40 and even more per ton for good, straight, well-grown fibre. During the early part of February, a farmer at Kingaroy sold two lots of fibre to a Brisbane firm at £40 per ton. At this price the growing of broom millet should be a highly remunerative industry, since the average yield of fibre within four months after sowing is 600 lb. per acre of broom and 1,500 lb. of seed. A second or ratoon crop can be harvested three months later, and this will yield an additional 500 lb. of fibre.

In order to meet the Queensland demand, broom fibre has to be imported to the value of £8,000 annually. The average annual demand in this State amounts to nearly 300,000 lb., and the supply from 200 acres planted amounted to 139,722 lb., of a value, at rates ruling at the end of the financial year of 1910, of £1,455.

Full particulars as to the cultivation and after treatment of the crop may be obtained from the Department of Agriculture and Stock.

WINTER CEREAL REPORT FOR 1910—STATE FARM, ROMA, BUNGEWORGORAI.

The following is the concluding portion of the Report of the Manager of the Roma State Farm, the first part of which appeared in the last issue of this journal:—

Loamy Soil (Area, Quarter-acre Blocks).

DIFFERENT MANURES USED, YIELDS, &c., IN THE HEAVIER SOIL BLOCK.

The Variety of Wheat Grown in all cases was Bunge No. 1.

No of Block.	Manure Applied.	Sown.	Earing.	Harvesting.	Yield—Rate per Acre.	Remarks.
1	Shirley's Cereal Manure; 1 cwt. to acre; cost, 5s. 6d.	13 May ...	Sept., 1st week	...	Bushels. 17.2	Manure is evidently inclined to produce straw, as this crop was taller with larger heads than the majority. This, under the conditions experienced, assisted in the reduction of yield. Rusty.
2	Shirley's Cereal Manure; 1 cwt. top dressing; $\frac{1}{2}$ -cwt. nitrate soda to acre; cost, 14s.	" ...	"	...	18.86	This block also looked extremely well, but suffered in the same manner as No. 1.
3	Shirley's Cereal Manure; $\frac{1}{2}$ -cwt. to acre top dressing; $\frac{1}{2}$ -cwt. nitrate soda; cost, 11s. 3d.	" ...	"	...	20.2	Did not make quite such long straw. Other remarks as applied to 1 and 2.
4	Unmanured ch ck block ...	" ...	"	...	17.6	Very little of this crop was lost; owing to storm straw shorter than the three preceding blocks. Very little flag rust noticeable.
5	Superphosphate; 1 cwt. to acre; cost, 5s. 6d.	" ...	"	24th ...	21.73	In general appearance this crop was not any better than the unmanured, but closer examination revealed that the heads were better filled and the plants had stood a little better. The straw was very little, if any, taller. There was more of this crop blown down than the unmanured, but less than in the first three blocks.

WINTER CEREAL REPORT FOR 1910—STATE FARM, ROMA, BUNGEWORGORAI—continued.

No. of Block.	Manure Applied.	Sown.	Ear'g.	Harv. sting	Yield—state per acre.	Remarks.
6	Thomas' Phosphate; 1 cwt. to acre; cost, 5s. 6d.	13 May	Sept, 1st week	24 Oct. ...	Bushels. 17·0	This was the only block which showed white tip to any extent. Straw short; very little lost by storm.
7	15 cwt. stable manure; $\frac{1}{2}$ -cwt. superphosphate; cost, 4s. 6d.	"	"	"	17·72	This crop was a good deal knocked about by the storm at one end. A mistake as to quantity of stable manure to be applied was made, which should be tons instead of hundred weight.
8	$\frac{1}{2}$ -cwt. superphosphate; $\frac{1}{2}$ -cwt. nitrate soda top dressing; cost, 11s. 3d.	"	"	23 Oct. ...	18·8	These blocks were dreadfully knocked about by wind, and were considerably more damaged by hail than others, being nearer the track of the storm.
9	$\frac{1}{2}$ -cwt. nitrate of soda; $\frac{1}{2}$ pot. sulphate; $\frac{1}{2}$ superphosphate; cost, 19s. 3d.	"	"	"	19·33	
10	$\frac{1}{2}$ -cwt. dried blood; $\frac{1}{2}$ potas. sulphate. 1 cwt. superphosphate; cost, 18s. 2d.	"	"	"	19·33	
11	Unmanured	"	"	"	18·20	
12	$\frac{1}{2}$ -cwt. dried blood; $\frac{1}{2}$ pot. sulphate; 1 cwt. Thomas' Phosphate; cost, 18s. 2d.	"	"	"	18·53	
13	$\frac{1}{2}$ -cwt. dried blood; $\frac{1}{2}$ pot. sulphate; 1 superphosphate; top dressing, nitrate soda; cost, 26s. 8d.	"	"	"	19·93	

Sandy Soil—Area Blocks One-eleventh Acre.

No. of Block.	Manure Applied.	Sown.	Earng.	Harvesting.	Yield.	Remarks.
1	Unmanured	7 June ...	Sept., 2nd week	11 Nov.	Bushels. 6·78	Straw in all cases was exceedingly short, being from 18 in. to 2 ft. in length. Plants did not tiller. Straw bright, free of rust. No damage received during storm. All grain being harvested It is intended to reduce the number of manures used, and carry out system of rotation cropping in conjunction with those decided upon.
2	Superphosphate 1 cwt. to acre; cost, per acre, 5s. 6d.	" ...	" ...	" ...	7·33	
3	Thomas' Phosphate 1 cwt. to acre; cost, per acre, 5s. 6d.	" ...	" ...	" ...	8·06	
4	15 cwt. per acre stable manure; $\frac{1}{2}$ -cwt. superphosphate; cost, per acre, 4s. 6d.	" ...	" ...	" ...	6·6	
5	Superphosphate $\frac{1}{2}$ cwt.; nitrate soda $\frac{1}{2}$ -cwt.; top dressing; cost, per acre, 11s. 3d.	" ...	" ...	" ...	7·51	
6	Nitrate soda $\frac{1}{2}$ -cwt.; pot. sulphate $\frac{1}{2}$ -cwt.; superphosphate $\frac{1}{2}$ -cwt.; cost, 19s. 3d.	" ...	" ...	" ...	8·25	
7	Dried blood $\frac{1}{2}$ cwt.; pot. sulphate $\frac{1}{2}$ -cwt.; superphosphate 1 cwt.; cost, 18s. 2d.	" ...	" ...	" ...	8·43	
8	Unmanured	" ...	" ...	" ...	6·41	
9	Dried blood $\frac{1}{2}$ -cwt.; pot. sulphate $\frac{1}{2}$ -cwt.; Thomas' Phosphate 1 cwt.; cost, 18s. 2d.	" ...	" ...	" ...	7·33	
10	Dried blood $\frac{1}{2}$ -cwt.; pot. sulphate $\frac{1}{2}$ -cwt.; superphosphate 1 cwt.; nitrate soda, top dressing, $\frac{1}{2}$ -cwt.; cost, 26s. 8d.	" ...	" ...	" ...	9·71	

The top dressing of nitrate of soda was applied in all instances when crops were in shot blade—23rd August—and it is thought that plants did not receive full benefit from it, owing to the fact that sufficient rain was not experienced to carry it to the roots of these until they were ripening off. Samples of grain from each block have been submitted to the chemist for analysis.

MISCELLANEOUS SOWINGS.

Bobs; area, 2 acres; sown, 25th May; harvested, 15th November; yield, 10·8 bushels to acre; grain, pinched and weathered. The growth attained this season was only 2 ft., and compares very unfavourably with that of last, which was 6 ft. Rust was again present in this crop.

Bunge No. 1 (black soil); area, $1\frac{3}{4}$; sown, 25th May; harvested, 31st October; yield, 14·6. Yield reduced by storm. This was put in with the intention of cutting it for hay, but owing to inability to sow cultivation experiment blocks, which reduced the grain-producing area of this wheat by 20 acres, it was allowed to mature for seed. The yield obtained from this block is better than the return of the C.O.S. block by 1·7 bushels to the acre, and it only received half the cultivation and was cropped last season.

Bunge No. 1 (clayey soil); area, 5 acres; sown, 2nd May; harvested, November; yield, 5·45 bushels to acre; practically destroyed by hail.

J. Brown; area, 5 acres; sown, 2nd May; earing, September, 2nd week; yield, 6·2 bushels to acre. This block was adjacent to the previous block, but, owing to the fact that it was just in the shot blade at the time, it was not so much damaged by hail. The small yield is mainly due to rust and dry weather. Crop ripened unevenly owing to inequality of soil. Originally it was intended to cut for hay, and 2 acres had been mown when rain was experienced, which prevented curing that which had been cut, and continued showery weather stopped further work in that direction until crop was too far gone to be use for such purpose.

Emmer Wheat; area, sown, 5 acres; sown, 3rd May; harvested, December; yield, approximate, 15 measured bushels to acre. For green feed or hay purposes this wheat is far too slow when compared with other varieties we have. Nevertheless it stands adverse conditions well and is free of rust. For hay purposes awns debar it for use in some opinions, but the grain as a food should be superior to ordinary wheat as it is enclosed in the husk, which necessitates masticating before being swallowed.

Manitoba; imported, 1910; sown, 15th June; earing, October, 1st week. Yield, 7 bushels to acre; grain very poor, appearance like carraway seeds; very rusty crop. This season has again proved that this variety requires a cooler climate for its development.

Warden hay wheat; area, $\frac{1}{2}$ acre; sown, 15th June; earing, 3rd week in September; harvested, 16th November; yield, 6·06. This wheat was sown on account good showing made in previous seasons, when it yielded 14·5 bushels to the acre. This yield was reduced by rust, which also rendered it worthless for hay. Straw exceedingly short, being about 18 in. long.

College; purple straw; area, $\frac{1}{2}$ acre; sown, 15th June; earing, 3rd week in September; harvested, 16th November; yield, 6 bushels to the acre. This wheat was also sown on account of its behaviour in 1909, when it yielded 15·5 bushels to the acre. This season it proved to be very rusty and rather late, although it is about the earliest maturing variety we have of this class of wheat. The straw was very short, being about 18 in. high.

SAMPLES.

Lot No. 1 (sown previously).

An area of about 1-100th of an acre was devoted to each of a variety coming under this heading, 63 in all. Owing to the continued poor showing of many of these and the extra work in this class which will be occasioned next year when sowing the hybrids raised here, the number selected from these for further sowing has been reduced to 20, and they are being retained for hybridising purposes.

Yield of the varieties cannot be given as the drills became so intermingled by storm as to prevent harvesting. A record of the behaviour of the individual kinds up to earing time was kept.

The varieties to be sown next year are as follow, viz. :—

Amby	Jumbuck
Belatourka	Kubanka
Bald Medeah	La Huguenot
Black Don	Morocco
Budd's Early	Mudgee
Bunyip	Silver King
Comeback	Stanley D.
Genoa	Uppercut
Indian Pearl	Turkey
Ward's Prolific	Warren.

Lot No. 2.

Seed supplied by Mr. William Reynolds, of Portugal.

Reynolds' Discovery, No. 1; sown, 3rd June; earing, October; harvested, December; Durum type of wheat; very long straw; large head; bearded; flag coarse; rather late maturing variety; little grain obtained for further sowing; very rusty.

Reynolds' Discovery, No. 2; sown, 3rd June; earing, October; harvested, ———. Of the same class as No. 1, but softer straw and much more susceptible to rust. Complete failure, no grain being obtained.

Lot No. 3.

Seed supplied by Senator McColl.

Sown for the first time this season. The seed in most instances was mixed. As a whole they are too late and too susceptible to rust to do any good here. No grain was obtained for further sowing. Sown, 3rd June; earing, October. The following were the varieties supplied, with short description :—

Frete; bearded variety; medium stout short straw; very late and very rusty.

Chul bearded; medium short fine straw; very late and very rusty.

Galagos; very late; short fine straw; red velvet chaff; bald with exception few terminal awns; very rusty.

Glyndon; very late; long stout straw; long head; good stooler; very flaggy (coarse).

Propo; very late; bearded; very rusty; medium short stout straw.

V. A. C.; very late; coarse straw; medium long narrow head; very rusty; good stooler.

Lot No. 4.

This consists of three drills of Bunge No. 1 and same number of J. Brown (200 plants in each). The sowings were made in order to test the relative value of each variety as a bunt resister as well as two bunt preventives. Previous to

being sown the grain was smutted by having bunt balls broken amongst it. The results obtained proved of very little value, as only four plants in J. Brown untreated were infested. The following were the pickles used:—

Bluestone: No smutted plants in either variety.

Untreated: Bunge, none; J. Browne, 4 equals 2 per cent.

Little's Sheep Dip; 1 in 8 water; no smutted plants in either variety. This experiment will be continued next year if only in order to test the efficacy of the sheep dip treatment, as should it prove to be all that is said about it the simplicity of it will render its use universal.

Lot No. 5.

These consisted of three selections made from Bunge and an early wheat from Manitoba crop, the latter proving to be Budd's Early.

Bunge Red (mottled). One plant selected from this season on account of its ability to stand up.

Bunge Red (large). This has been again selected from on the same lines as last season.

Bunge White (mottled). As no difference was noticeable in this grain this season no further selections were made.

Lot No. 6.

In this are comprised all the crosses made to date, and will next year entail a great deal of extra work in sowing, &c. As no crossing was carried out last season, the youngest generation is F₂, one in which the success or otherwise of the cross made can to a great extent be determined in some more than others, such as Federation X Bunge, where a long and short straw have been used.

I may state that Dr. Wilson, one of the members of the Scottish Commission which visited this farm, and who has been engaged on this class of work for a number of years, very kindly furnished me with some hints which will simplify as well as prove of great value in carrying out this work in the future.

1907 Crosses.

Ward's X Poland, F₂.—Forty-four selections were made from this cross for further sowing this season. This number, owing to rustiness, has been further reduced to 21. Of these, one variety gives promise of being suitable for growing for silage purposes, and as it came true this season it can be further tested next. The results of this cross as a whole cannot be looked upon to afford anything as good as we have, as both varieties crossed are rusty ones; but owing to length of head some may prove of value as a parent in making crosses later on.

1908.

Bunge No. 1 (male) X Federation (female), F₁.—The crossing of these two varieties was made owing to the fact that they both possessed characteristics desirable in a wheat for the conditions here, and by the results obtained it is hoped that a step in the desired direction has been made. So far as can be noted, the tillering and short strawed characteristics of the Federation are found in conjunction with the white chaff, earliness, and rust resistance of the Bunge in some instances.

Alpha (male) X Bunge (female).—This cross has furnished a number of plants well worthy of further sowing, some being exceedingly early. Alpha in 1909 was wholly destroyed by rust, whereas this season, which proved again to be rusty, some of the cross breeds with the heavy ear of the Alpha had some of the cleanest straw on the farm.

Durum (male) X Bunge (female).—Owing to the similarity in the structural portion of the plants—viz., fine straw—the differences here were not so marked as elsewhere. Though a number have been selected for further trial, it cannot be stated that an improvement has resulted.

Bunge (male) X Durum (female).—The differences here are very marked, but as in the previous mentioned it cannot be said yet that an improvement has resulted.

Bunge (male), 1907, X (female).—The differences here are very marked but of very little utility.

Bunge (female) 1907, X (male).—The differences most noticeable were in the straw and grain, and are apparently of no value.

Bunyip (female) X Bunge (male).—This cross provided some very dry clean short-strawed wheats, and it is hoped that some of these will prove superior to either parent. A great number of these have been selected for further sowing next year.

Bunge (male) X Cretan (female).—The only improvement noticeable amongst these is that some have the beardless head of the Bunge with the nice bright straw of the Cretan, otherwise results obtained do not signify much.

Bobs (male) X 1891 (female).—The plants as a whole resulting from this cross are susceptible to rust, and too late to be of much value.

Cross-bred 50 X Cretan (female).—Only one plant was deemed worthy of selecting for sowing next season.

Bunge Red (male) X Federation (female).—The variations met with in this cross were numerous and good, and a great number proved worthy of further trial next season.

Federation (male) X Cross 50. —These plants proved to be very rusty, and only a few were deemed worthy of being sown next season.

Bunyip (male) X Federation (female).—These two short-strawed rusty varieties of wheat were not looked upon to provide anything good, nevertheless a few of the results are deemed worthy of further propagation.

Durum (male) X 343 (female).—The results obtained from this cross compare very unfavourably as a whole with those obtained from Bunge X Federation or Bunyip and Bunge, and are on a par with the other Durum crosses.

1910.

The following crosses were made this season:—

Bunge (F.) X Yandilla King (M.)	} Destroyed by hail.
Bunge (F.) X J. C. 157.	
Bunge (F.) X Nhill	
Bunge Red (F.) X Nhill (M.)	
Bunge No. 1 (F.) X J. Brown (M.)	
Bunge Red (F.) X Indian Pearl (M.)	
Bunge Red (F.) X Bunyip (M.)	
Bunyip (F.) X Indian Pearl (M.)	
Bunyip (F.) X Cretan (M.)	
Bunyip (F.) X Nhill (M.)	
Bunyip (F.) X J. C. 157 (M.)	
Bunyip (F.) X Hermitage (M.)	
Bunyip (F.) X Bunge Red (M.)	
Bunyip (F.) X Ward's Poland (M.)	
Federation (F.) X Cretan (M.)	

Lot No. 7.

Bunge (?) Selected in 1907. With the 3 lb. obtained last year about one-ninth of an acre was sown, yielding a return equal to 19 bushels per acre, a sample of which has been forwarded to the Agricultural Chemist for analysis. The grain, notwithstanding that conditions were adverse to its being of good colour, looked well and was larger than in 1909. The variety is as early as Bunge No. 1, and is, like it, rather fine in the straw and open in the head. It proved to be a good rust resister.

Federation; area sown, one-sixteenth acre; sown, 9th June; harvested, 15th October; yield, 17.6 bushels to acre. This yield came as a surprise, as the crop was so infested with rust at flowering time that it was thought no grain would be formed. The wheat embodies, with one exception, all the qualities necessary in a wheat suitable for this district, the exception being that it is not a rust-resister, though its behaviour this season, which is opposite to that of last, would lead to the opinion being formed that it is sufficiently sown. The seed sown this year, which was graded in winnower, is the grain of those plants which suffered least last season, and this characteristic has evidently been transmitted to the plants, resulting from the grain of these, which is only another argument in favour of grading.

OATS.

Garton's Universal (white); area, 1 acre; sown, 25th May; harvested 11th November; yield, 16 bushels to acre. Yield reduced by rust, with which this crop was badly infested. Grain harvested with stripper.

Garton's Bountiful (black); area, $\frac{1}{8}$ acre; sown, 9th June; harvested, 23rd November; yield, 24 bushels to acre. This variety is later than the preceding one, but is not so susceptible to rust. Harvested with stripper.

RESULTS OF OBSERVATIONS FOR 1910.

Five wheats proved a total failure in most instances, due to rustiness and lateness.

Durum wheats have again demonstrated that their qualities as drought-withstanders are inferior to our best wheats.

Early varieties are the best for general farming, as they are not so injured by rust, and their grain is matured naturally, not being ripened off prematurely by the hot weather, as is generally the case with the late-maturing varieties.

It may be stated that early varieties sown late are susceptible to rust in rusty seasons. This year has again demonstrated that crops grown from and germinating in May are the best.

Rate of seeding.—With most varieties half a bushel to the acre has been found sufficient in this climate, but next year it is hoped to test the results obtained from sowing different quantities of two or three of our best wheats.

The best varieties grown this year have again proved to be Bunge No. 1, with Federation 2nd and Yandilla King 3rd.

Plate X.



IMPORTED TWO-YEAR-OLD LINCOLN RED HEIFER, BRACEBRIDGE.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

RECORD OF COWS FOR MONTH OF JANUARY, 1911.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Average Test Per cent.	Commercial Butter.	Remarks.
			Lb.		Lb.	
Graceful ...	Shorthorn...	28 Dec., 1910	1,146	4.7	60.65	
Nellie II. ...	"	30 Nov. "	1,212	3.8	51.32	
Lass ...	Ayrshire ...	5 Nov. "	1,125	4.0	50.28	
Careless ...	Jersey ...	16 Dec. "	1,047	4.2	49.25	
Lark ...	Ayrshire ...	22 Dec. "	1,219	3.6	48.76	
Glen ...	Grade Shorthorn	21 July "	837	4.8	45.28	
Orange ...	Grade Guernsey ...	6 Dec. "	986	4.0	44.06	
Hettie ...	Grade Shorthorn	15 Oct. "	824	4.4	43.61	
Mona ...	Grade Holstein ...	14 Aug. "	1,041	3.6	41.64	
Conceit ...	Ayrshire ...	18 Nov. "	855	4.2	40.22	
College Lass	"	22 Aug. "	798	4.4	39.41	
Dot ...	Shorthorn ...	26 Dec. "	889	4.0	39.73	
Rhoda ...	Grade Shorthorn	9 Nov. "	792	4.4	39.11	
Honeycomb	Shorthorn ...	25 June "	791	4.4	39.06	
Grace ...	"	21 Dec. "	1,005	3.5	39.01	
Lady Kelso...	"	26 Nov. "	1,091	3.2	38.49	
Remit ...	Holstein ...	8 July "	777	4.4	38.37	
Eve ...	Jersey ...	27 Aug. "	580	5.5	37.48	
Auntie ...	Ayrshire ...	8 Aug. "	768	4.2	36.13	
Butter ...	Shorthorn ...	14 Aug. "	800	4.0	35.76	
Lemonade ...	Grade Guernsey...	25 May "	579	5.2	35.26	First calf
M'dam Melba	Shorthorn - Hol-					
	stein cross	19 Dec. "	985	3.2	34.75	
Lady Lock...	Ayrshire ...	4 Dec. "	1,007	3.1	34.34	
Helen ...	Grade Guernsey ...	20 Oct. "	856	3.6	34.24	
Beamie ...	Ayrshire ...	7 Nov. "	874	3.5	33.91	
Patch ...	Grade Shorthorn	16 Nov. "	958	3.2	33.80	
No. 112 ...	Grade Guernsey ...	24 Oct. "	786	3.8	33.27	
Dewdrop ...	Holstein ...	15 Nov. "	1,003	3.0	33.03	
Cuckoo ...	Jersey ...	8 July "	599	4.8	32.40	
Lavina's						
Pride ...	Ayrshire ...	18 Oct. "	796	3.5	30.89	
Lady Moreton	Shorthorn ...	21 Nov. "	919	3.0	30.25	
Lalla ...	Grade Holstein ...	12 Oct. "	770	3.5	29.88	
Night ...	"	11 Nov. "	775	3.4	29.16	
Nancy ...	Grade Shorthorn	10 Aug. "	852	3.1	29.05	
Norma ...	Shorthorh...	15 July "	630	4.0	28.16	First calf

The returns as given above may be looked upon as highly satisfactory, considering the prolonged wet weather of January when there were sixteen wet days and a total rainfall of 12.03 inches, which soured the grass, and that the cows were only fed on the natural grasses. With three exceptions all these cows were bred at the College by Mr. Mahon, and they afford a good object lesson to dairymen in proving what can be done by the careful selection and mating of animals.—ED. Q.A.J.

IMPORTED STOCK.

Another of the pure-bred cattle brought by Mr. John Mahon from the old country, the Lincoln Red Heifer "Bracebridge," is here illustrated:—

Pedigree of Two-year-old Lincoln Red Heifer, Bracebridge (195 B).

Sire—Scampton Herald.	Dam—Bracebridge (No. 48 B).
g s Bracebridge Boothby.	g d Bracebridge (No. 170).
g g s Bracebridge Ormoty.	g g d Sudbrook (No. 163).
g g g s Withern Marshmam.	g g g d Sudbrook (No. 19).
g g g g s Worlaby.	
g g g g g s Marnham.	

The Horse.

HORSES IN EUROPE.

Mr. John Mahon, Principal of the Queensland Agricultural College, Gatton, made special inquiries, during his tour through the United Kingdom and on the Continent, concerning horse-breeding, and as regards horses in the United Kingdom he made the following statements to the "Brisbane Courier":—

"He pointed out that there was a great shortage of army and artillery horses in the United Kingdom, notwithstanding that the demand for 'bus, cab, and carriage horses was on the decrease. The reason of the latter was that motor cars and motor 'buses were being brought more and more into use. Some idea of the rapid growth of the motor car will be shown by the following figures. In 1907 there were 10,492 cab horses in daily use in London, and 96 motor cars. At the time of his visit there were 5,714 cab horses and 5,070 motor cars. In 1907 there were 2,964 'bus horses and 783 motor 'buses. To-day there were 1,518 horses and 1,063 motors. But even with that decreasing demand for horses the army was short of animals suitable for its purpose. The chief reason was that the army would not purchase animals until over three years old, and foreigners had been busy buying all suitable horses at three years. The army authorities were being taken to task very severely for their neglect to look after the national interests in that matter.

"Speaking on the subject of giving Government assistance to horse breeding, Mr. Mahon pointed out that some years ago the English Government provided an annual grant of £5,000 for that purpose. It was used in giving premiums to approved thoroughbred stallions to be at the public service in certain districts. The stock had turned out well, but the foreigners had there again snapped them up for army purposes, and the British Army could not get its requirements filled.

"The British Board of Trade was now formulating a scheme for assisting horse breeding. It was proposed to make a grant from the Treasury of £50,000, to be controlled by an advisory board. A substantial sum was to be paid as premiums for approved stallions to travel the country. Free nomination would be given for approved mares owned by small tenant farmers to premium stallions. Then owners of stallions were to be assisted to purchase a better class of horse. The lines generally were similar to those in vogue in Ireland, where some magnificent horses were to be found.

"At the Dublin Horse Show foreign buyers purchased all the best horses at high figures. He was also present at the Bath and West and Southern Counties' Show at Rochester, where the War Office worked in conjunction with the society to show the types of animals required for military purposes. The army sent exhibits of the classes they desired for artillery, cavalry, and mounted infantry work, and distributed pamphlets giving the characteristics of each type; so that the farmers might know the standard to breed to.

"Referring to general horses, Mr. Mahon went on to say that the light classes he saw in England were not what he expected, with the exception of carriage horses. There were too many nondescripts, indicating that attention had not been paid to breeding to any fixed type. The hackney sorts were most in favour, being high-stepping animals, with plenty of action but no

pace—an animal that would be classed in Australia as a show or Sunday horse, and totally unsuitable for ordinary work out here. The carriage horses were very fine animals, bred mostly as a cross of the Cleveland Bay and the thoroughbred. The small farmer seldom rode a horse, and therefore did not breed light sorts as a rule.

“In the heavy classes 90 per cent. of the draught horses in England were Shires, and the demand for them was great. The railway companies, contractors, and others required a horse that was capable of drawing the heaviest loads, because the congested traffic in London and other great centres rendered travelling slow and delays frequent.

“The old weighty Clydesdale of twenty years ago he found had to a great extent been replaced by a lighter animal, with fine bone, long pasterns, close hocks, turned in, with large flat hoofs, and good action both behind and in front. Mares with wide or turned-out hocks were not considered suitable for breeding. The colours of many of the best Clydesdales were bad: white legs up to the body, white face, and frequently patches of white on the body—indeed, some of them would be classed in Australia as skewbald. Judges at the shows did not appear to give any merit for colour. Many of the breeders, he found, had reverted from the old type because of the demand of foreign buyers for lighter horses. Some of the old breeders informed him that they could, without the introduction of Shire blood, reproduce the old type by a little management in selecting and mating, together with more liberal feeding. There were still to be found in Scotland many fine stallions and mares of the old type, but they could not be purchased except at very high figures.

“There were no large horse-breeding establishments in Scotland; all the best horses were bred by farmers who kept a few mares, according to the size of the holding. The practice was for a number of farmers to form a society and select a stallion, for which they paid a premium of from £100 to £200, to travel the district, the farmers guaranteeing 60 or 70 mares at a fee of £4 to £8 each. Half the fee was paid down, and the balance when the mare proved to be in foal. The colts and fillies were all bought up by dealers before they were twelve months old. Those dealers had a staff of trained grooms, who handled the animals and taught them their paces, so that they were available for British or foreign buyers. The dealers knew the horse from A to Z, and it was rarely anyone got the better of them in a bargain. The breeders preferred to sell to the dealers because the latter were always ready to buy, and the foreign buyers preferred to purchase from the dealer.

“The principal buyers of Clydesdales were Canadians, Argentines, and South Africans, and they were prepared to give very high prices for what they wanted, but in every case a full pedigree had to go with the animal. The best class of stallions could not be purchased under 1,000 guineas, while mares went from 300 guineas upwards.

“The matter of establishing a Clydesdale stud-book for Queensland Mr. Mahon regarded as of the greatest importance, and he had obtained full information of the methods and lines upon which the Scotch Stud Book was conducted, so that it might be available if one were started here.”

The Orchard.

THE FRIENDS OF THE ORCHARDIST.

Notwithstanding the provisions of the Native Birds Protection Act, the destruction of many of our useful wild birds still goes on, not only in sparsely inhabited outlying districts, but even in the neighbourhood of large towns. The nefarious business is only partly checked, and the pea-rifle, shot gun, the trap, and even the "shang-hae" are still much in evidence, particularly on holidays. One clause of the Act reads thus:—

"If any person shall wilfully kill or destroy any native bird within the periods hereinbefore mentioned (by which is meant the close seasons for various birds specified in the Act), or shall use any instrument whatever, net, or any other means (other means includes traps so much in evidence in country districts), within the period aforesaid, for the purpose of killing or destroying any native bird, such person shall, upon conviction, forfeit and pay a fine of not less than one pound or more than five pounds, and in default of payment undergo imprisonment for any term not exceeding three months."

By further provisions of the Act, the user of any mechanical means, be it gun, net, or trap, for catching or destroying birds out of season, must deliver up any such instrument to any person who shall demand the same.

To show how little even educated persons, who are supposed to know better, know or care about the Act, here is an instance:—In the early part of February, large numbers of sea curlews, and other birds frequenting the sand banks on the coast, were very plentiful, and a gentleman from Brisbane lamented that he had no gun, the birds being very tame, too tame indeed for "Sport" so-called. It was mentioned to him that these birds had families of young ones just able to run about. "Oh! my troubles about the young ones!" he said. It was not long before some six little curlews came running along after their mother, which this gentleman lamented his inability to destroy.

We have already suggested that every State and private school in the State should be supplied with coloured pictures of all our useful birds, and that the teachers should cause the pupils to study these and thus learn their value to the country.

A very excellent article on this subject lately appeared in the "California Fruitgrower," by Mr. W. O. Emerson. In the United States, the greatest care is taken to instruct both city and country people in the habits of all birds in the country, and excellent results have been obtained in the matter of the preservation of useful birds. Mr. Emerson writes:—

"From an economic point of view the value of bird life and the relation of the birds to the farmer and fruitgrower cannot be over-estimated. They play the part of an important factor in the preservation of fruit from the depredations of insect pests, and as such should have the fullest protection from orchardists. Their economic value was not investigated to any extent until some ten years ago, when the United States Department of Agriculture formed a Division of Economic Ornithology for the scientific and careful examination of the food of birds.

"Since that time bulletins have been regularly issued on the beneficial birds found throughout the United States. Of the 13,000 species of birds known to science about 1,000 are known to North America. Of the land birds there are some 360 which live entirely on insects; 630 live more or less on insect life while nearly 100 depend entirely on such food as the seeds of weeds and wild grain the year round.

"Birds occupy a secondary place in the scale of life (mammals occupying the first) and are most closely related to the reptiles, as we find the earlier

types having teeth, representatives of the early Jurassic period. Birds are found at home from pole to pole equally content whether on ocean wave, in Arctic snows, on arid deserts or in the dense shade of the tropical forests.

"Every day we find that the birds are preventing the increase of injurious insects and small rodents as well as of harmful plant seeds. Take any one day and consider the amount of food a bird consumes, particularly when they have broods of from four to nine, each little mouth taking in several ounces per day. This destruction of injurious material is not only going on through each day, but is continued through the night by the owls, night-hawks, and poor-wills. Swallows and swifts keep down the insect growth in air, while various species of fly-catchers, warblers, vireos, and humming birds are busy in and about the foliage. Woodpeckers, nutatches, titmice, and gnatcatchers are always busy working over the limbs and tree trunks while innumerable varieties of thrushes and sparrows are continually at work on the ground seeking terrestrial insects as well as worms and seeds.

WHAT BIRDS CONSUME.

"Birds digest their food so rapidly that it is difficult to determine just how much they consume during a day's feeding. E. H. Forbush, of the Board of Agriculture of Massachusetts, states that the stomachs of four small chickadees contained 1,028 eggs of the canker worm; the stomachs of four others had about 600 eggs and 105 female moths of the canker worm in them. It was estimated that one chickadee feeding for twenty-five days would destroy some 138,750 eggs of this noxious worm, a phenomenal amount for so small a bird.

"Professor Forbes, Director of the Illinois State Laboratory of Natural History, found in the stomach of a single robin 175 of *Bibis* (a fly) which, in the larvæ stage, feeds on the roots of grass. From a few facts of this nature we can see what an economic factor the birds are, flitting about our farms and orchards by day and night. Hawks and owls especially, that are usually so condemned by the farmer and sportsmen in general, are constantly protecting the crops by killing off thousands of small rodents so destructive to grain and trees, and also by consuming millions of grasshoppers in the fall of the year. In fact, many species of hawks prey wholly on grasshoppers.

"As time rolls on and vast stretches of land come under cultivation we shall see the need of giving more attention to the study and protection of bird life, as the birds seek homes about our premises, to raise their broods and render a valuable service in keeping in check millions of noxious insect pests. It is stated as a fact by one of the leading entomologists of the United States that insects alone cause an annual loss of at least 200,000,000 dollars to the agricultural interests of this country. Thousands of the trees in our great city parks as well as vast forests are already affected by a species of scale, which cannot be checked without a great outlay of time and money, but which can be kept in check if we will give protection to our bird life by wise legislation.

"The amount of harmful seeds destroyed by birds throughout the year amounts into millions of pounds, as one of the United States Department of Agriculture ornithologists has figured out. One species of seed-eating birds of the Junco family, consumes at the rate of one-fourth of an ounce per day, and they average ten juncos to each square mile of land. In 200 days this species in the State of Iowa alone consumes 875 tons of noxious weed seed. Large as the figures seem they certainly fall far short of the reality.

THEIR ECONOMIC VALUE.

"In treating of the economic value of birds it has been mainly to show them as consuming insects only, whereas we here find them feeding on thousands of pounds of harmful weed seeds as well, which fact has not been fully known and appreciated. One of our many small sparrows will fill his crop with

a thousand seeds of the pigweed for its breakfast, and as many as 7,500 seeds have been counted from a dove's crop. Among many of the birds which feed on seeds are the pawhees, song sparrows, lark finches, horned larks, grosbeaks, gambels, golden-crowned and field sparrows as well as seven varieties of gold-finches and others.

"While many of our birds are known to now and then eat of our fruits, if we carefully compare the benefits accruing from their work the balance will easily be in their favour. Why should we not give them some protection? Thousands are being killed every month by one means or another and they threaten to soon become scarce about our homes and orchards."

In conclusion, Mr. Emerson suggested that the game warden could be serving the fruit interests and at the same time render the breaking of the law less liable, if he would cause to be posted conspicuously in each school-room in Santa Cruz county a copy of the game laws. It would make a lasting impression upon the minds of the youth, and would doubtless save thousands of dollars to the fruitgrowers of the State.

For full information concerning the insectivorous, granivorous, and omnivorous birds of Queensland, together with the close seasons, we refer our readers to the issue of this journal for October, 1905.

FERTILISERS FOR FRUIT TREES.

Mr. A. H. Benson, late Instructor in Fruit Culture to the Department of Agriculture and Stock in Queensland, now Director of Agriculture in Tasmania, has published the following method of ascertaining the requirements of the soil for growing apples and apricots. The experiments here given should prove of much value to fruitgrowers:—

Experiment 1.—Give six trees 2 lb. of superphosphate per tree.

Experiment 2.—Give six trees 1 lb. of sulphate of potash per tree.

Experiment 3.—Give six trees 1 lb. of sulphate of ammonia per tree.

Experiment 4.—Give six trees 2 lb. of superphosphate and 1 lb. of sulphate of potash per tree.

Experiment 5.—Give six trees 2 lb. of superphosphate of potash and 1 lb. of sulphate of ammonia per tree.

Experiment 6.—Give six trees 1 lb. of sulphate of potash and 1 lb. of sulphate of ammonia per tree.

Experiment 7.—Give six trees 2 lb. superphosphate, 1 lb. sulphate of potash, and 1 lb. sulphate of ammonia per tree.

Experiment 8.—Give six trees no manure.

These experiments will show you exactly what the soil requires.

As regards the manuring of apples, the Director has gone carefully into the matter, and from the information available he finds, in order to produce the leaves, wood, roots, and fruit for a crop of 250 bushels per acre of apples, the following plant foods approximately, are required, namely:—Nitrogen, 34 lb.; phosphoric acid, 12 lb.; potash, 28 lb.

To obtain these plant foods the following manures would be required:—34 lb. of nitrogen can be obtained from $1\frac{1}{2}$ cwt. of sulphate of ammonia; 12 lb. of phosphoric acid can be obtained from 76 lb. of superphosphate containing 17 per cent. of water-soluble phosphoric acid; 28 lb. of potash can be obtained from 56 lb. of sulphate of potash.

As a quantity of nitrogen is required to produce the leaves, which, when they fall and rot again return to the soil much of the nitrogen they have taken from it, it is possible that the quantity of nitrogenous manure can be reduced without running any danger, in which case the following mixture should meet the case:—1 cwt. of sulphate of ammonia or 1 cwt. of nitrate of soda; 1 cwt. of superphosphate, containing 17 per cent. water-soluble phosphoric acid; $\frac{1}{2}$ cwt. of sulphate or muriate of potash per acre. This will give a complete manure in an available form containing about 20 lb. of nitrogen, 19 lb. of

phosphoric acid, and 30 lb. of potash per acre, and should cost about 26s. to 28s. if well bought.

The ash of the wood of the apple tree is rich in lime, so that if the soil is deficient in lime a dressing of half a ton to 1 ton per acre would be of benefit. This is a matter that will be determined by the analysis.

When manuring apricot trees it must be remembered that a crop of 250 bushels at 40 lb. to the bushel, or a total crop of 10,000 lb. of fruit per acre, will take the following plant food from the soil:—Nineteen pounds of nitrogen, 6 lb. of phosphoric acid, and 29 lb. of potash in the fruit alone. It will, therefore, be necessary to use the following manure per acre:—1 cwt. of nitrate of soda or sulphate of ammonia; 1 cwt. of superphosphate, 17 per cent. soluble phosphoric acid; 1 cwt. of sulphate of muriate of potash.

The nitrogen is somewhat low when the production of leaves, wood, and roots is taken into consideration, but the phosphoric acid and potash should be ample.

The most expensive plant food to be returned to the soil is nitrogen, and this Mr. Benson advises the grower to obtain by green-crop manuring in future, as this will materially decrease the manure bill.

Statistics.

COMMONWEALTH METEOROLOGY.

RAINFALL OF QUEENSLAND.

TABLE SHOWING THE TOTAL RAINFALL FOR EACH MONTH OF THE YEAR IN THE AGRICULTURAL DISTRICTS OF QUEENSLAND.

STATIONS.	1910.												1911.
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
<i>North.</i>													
Bowen	15.45	7.10	21.45	5.26	0.18	2.23	0.58	0.18	3.75	0.30	3.89	5.36	23.72
Cairns	21.80	17.12	24.16	16.13	3.51	6.59	Nil	3.59	1.34	1.67	7.27	11.59	34.49
Geraldton (Innisfail) ...	20.35	34.57	33.74	24.57	11.90	19.35	1.34	7.42	11.51	3.18	7.30	4.77	36.96
Gindie State Farm ...	...	...	...	...	...	2.65	1.45	Nil	...	...	...	3.87	9.21
Herberton	16.64	12.21	12.40	3.50	1.85	1.70	Nil	0.83	0.58	0.43	4.93	9.71	11.43
Hughenden	4.52	3.59	2.95	0.30	0.41	0.85	0.48	Nil	2.75	1.57	3.41	1.13	9.15
Kamerunga State Nurs.	...	...	...	...	...	Nil	...	3.39	...	2.06	...	...	...
Mackay	35.28	9.73	24.31	6.18	3.73	5.70	1.1	0.48	4.32	0.7	2.67	2.15	30.52
Mossman	...	...	...	...	...	...	...	1.91	2.90	3.17	10.36	19.91	32.76
Rockhampton	11.93	1.28	19.84	0.61	0.59	5.98	1.67	0.23	1.62	0.99	4.17	2.46	9.64
Townsville	23.07	10.83	17.21	2.29	0.26	1.05	0.33	0.3	3.34	0.11	2.53	6.77	25.40
<i>South.</i>													
Biggenden State Farm	7.22	3.99	3.82	0.73	1.06	5.25	0.92	0.28	...	2.36	4.59	5.93	10.37
Brisbane	7.24	4.19	6.42	1.22	0.43	6.74	0.39	...	2.72	3.27	2.49	13.99	10.30
Bundaberg	11.81	2.43	8.92	0.31	0.19	6.17	2.10	0.16	2.33	0.70	8.39	1.58	21.05
*Cromhurst	11.60	3.39	19.35	3.39	4.44	11.78	0.63	0.70	2.30	3.83	3.31	6.20	28.85
Dalby	10.88	1.33	3.87	Nil	Nil	6.06	1.42	0.64	2.11	3.96	4.09	3.29	8.08
Esk	8.60	1.94	6.09	1.19	0.27	4.74	0.58	0.23	4.65	3.41	3.84	7.53	11.90
Gatton Agric. College	11.79	...	3.66	0.69	0.61	5.05	1.99	0.60	...	3.60	2.85	6.84	12.03
Gympie	5.92	3.48	7.74	1.13	0.22	5.57	0.83	0.32	1.54	2.90	3.16	1.96	9.13
Ipswich	6.91	2.78	3.56	1.65	0.20	3.74	1.67	0.58	1.55	3.70	1.96	5.04	8.15
Maryborough	5.65	2.99	3.92	1.72	0.64	4.89	1.09	0.35	1.22	1.53	4.19	3.19	16.93
Roma	4.74	1.47	8.36	0.15	0.4	5.71	1.24	Nil	0.46	3.64	4.39	0.96	11.52
Roma State Farm ...	...	...	...	...	...	...	...	...	0.38	2.95	3.50	7.97	9.72
Tewantin	5.96	3.42	15.18	6.30	1.31	15.08	0.76	1.34	1.52	3.17	7.71	8.25	20.84
Warren State Farm ...	...	...	...	...	...	1.88	...	...	...	0.45	...	...	...
Warwick	3.93	3.14	2.57	0.68	0.55	3.16	1.82	0.54	1.39	2.20	3.86	3.46	7.13
" Hermitage	...	...	...	...	...	...	1.73	0.39	...	...	...	...	...
State Farm	...	...	...	...	...	...	...	...	...	...	...	...	...
Westbrook State Farm	...	...	...	...	...	2.77	...	...	...	2.98	...	4.44	5.26
Yandina	6.71	2.07	11.81	3.26	0.40	13.13	0.70	0.15	0.88	3.34	5.16	16.05	12.04

NOTE.—The rainfall data in this table are compiled from telegraphic reports, and must be considered as approximate only.

* Total for the year 70.92 in., which is 10.04 in. below the average for the past eighteen years. The rainfall at this station is fairly representative of that of the whole Blackall Range, and as it attained a certain amount of celebrity during 1893, I thought that it might perhaps interest you.

GEORGE G. BOND, Divisional Officer.

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

By F. MANSON BAILEY, C.M.G., F.L.S., Colonial Botanist.

Order CAPPARIDEÆ.

CAPPARIS, Linn.

SECTION BUSBECKIA.

C. ornans, *F. v. M.*, *Fragm.* V. 104; IX. 173; and *Flora Austr.* I. 95. Fruit unknown. (Plate XII.) The following description of a fruit lately received from Miss L. Mark, of Sellheim, is probably the part wanting in the diagnosis:—Fruit indehiscent, oblong, $4\frac{1}{2}$ in. long, $2\frac{1}{2}$ in. broad, ribs 8, more or less visible, shortly tapering at the base, the stigma hardened and forming an oblique or recurved hornlike apex to the fruit; rind very thin, the outside bearing prickles. Seeds of irregular shape, about 5 lines long, rather thick, light-brown, embedded in a yellow sweetish pulp; only a small portion of the stipes preserved.

C. areolata, *Bail. sp. nov.* (Plate XIII.) A small tree or shrub of about 12 ft.; usually met with on borders of scrubs and river sides. Bark of a light-grey colour, roughly furrowed and corky on the thick branches, and more deeply so on the stems. Branchlets hoary, white terete. Leaves broadly elliptic, from scarcely 2 in. long and $1\frac{1}{2}$ in. broad to about $2\frac{3}{4}$ in. long and $2\frac{1}{4}$ in. broad, more or less tapering on to the petiole, and bearing at the apex a short prickle. The parallel lateral nerves regular and rather numerous. Petioles about 1 in. long, hoary, and rather slender. Flowers white, axillary, solitary, or more in the upper axils; peduncles about $1\frac{1}{2}$ in. long, often flattened and hoary. Buds conical, with 4 prominent angles. Petals very irregularly shaped, tomentose, especially at base. Fruit globose, about 3 in. diameter, strongly and irregularly netted on the outside. Stipe thick, netted, about 3 in. long. Seeds embedded in a rich dark-yellow pulp.

Hab.: Tiaro, North Coast Line, *J. McMullan*.

Order RUTACEÆ.

TRIBE ZANTHOSCYLÆ.

MELICOPE, Forst.

M. pubescens, *Bail.* To the description in *Bot. Bull.* No. 3, p. 9, *Queensl. Flora*, p. 199, add:—Fruit, depressed globular, $1\frac{1}{2}$ in. diam., $\frac{3}{4}$ in. height, white, lobed almost to the base, but the lobes incurved and so pressed to each other as to give the appearance of an entire fruit; very fleshy and of an agreeable acid flavour. Seeds black, tuberculate, 2 lines long, 1 line broad.—Described from fruits received from Mr. W. D. Francis, Kin Kin, North Coast Line.

Order LEGUMINOSÆ

TRIBE GENISTEÆ.

ULEX, Linn.

Calyx coloured like the petals, divided nearly to the base into two concave segments or lips, which are entire or minutely toothed at the top. Stamens all united into a complete sheath. Pod few-seeded, scarcely longer than the calyx. A genus of few species of Europe and N.W. Africa.

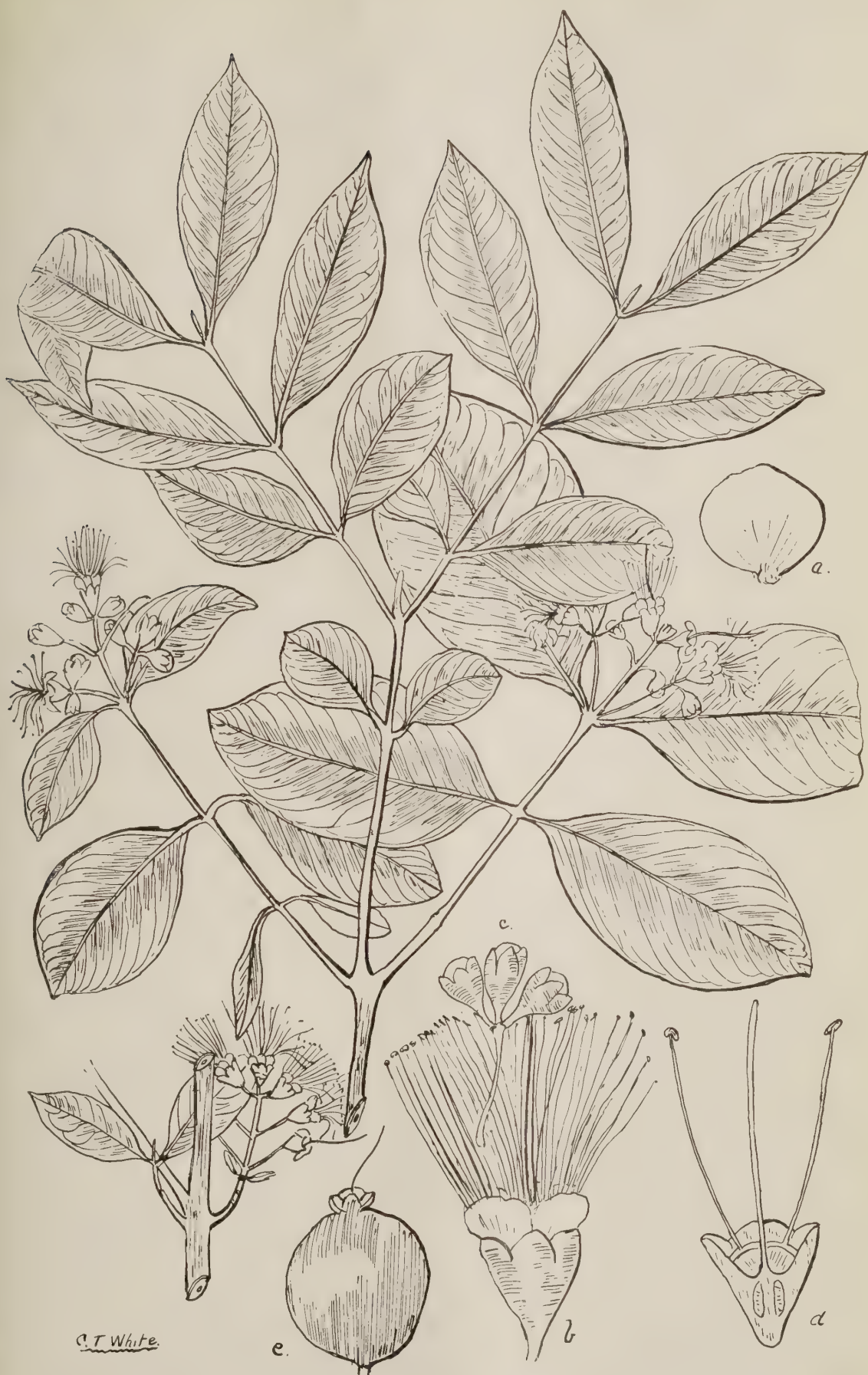


C.T.W.

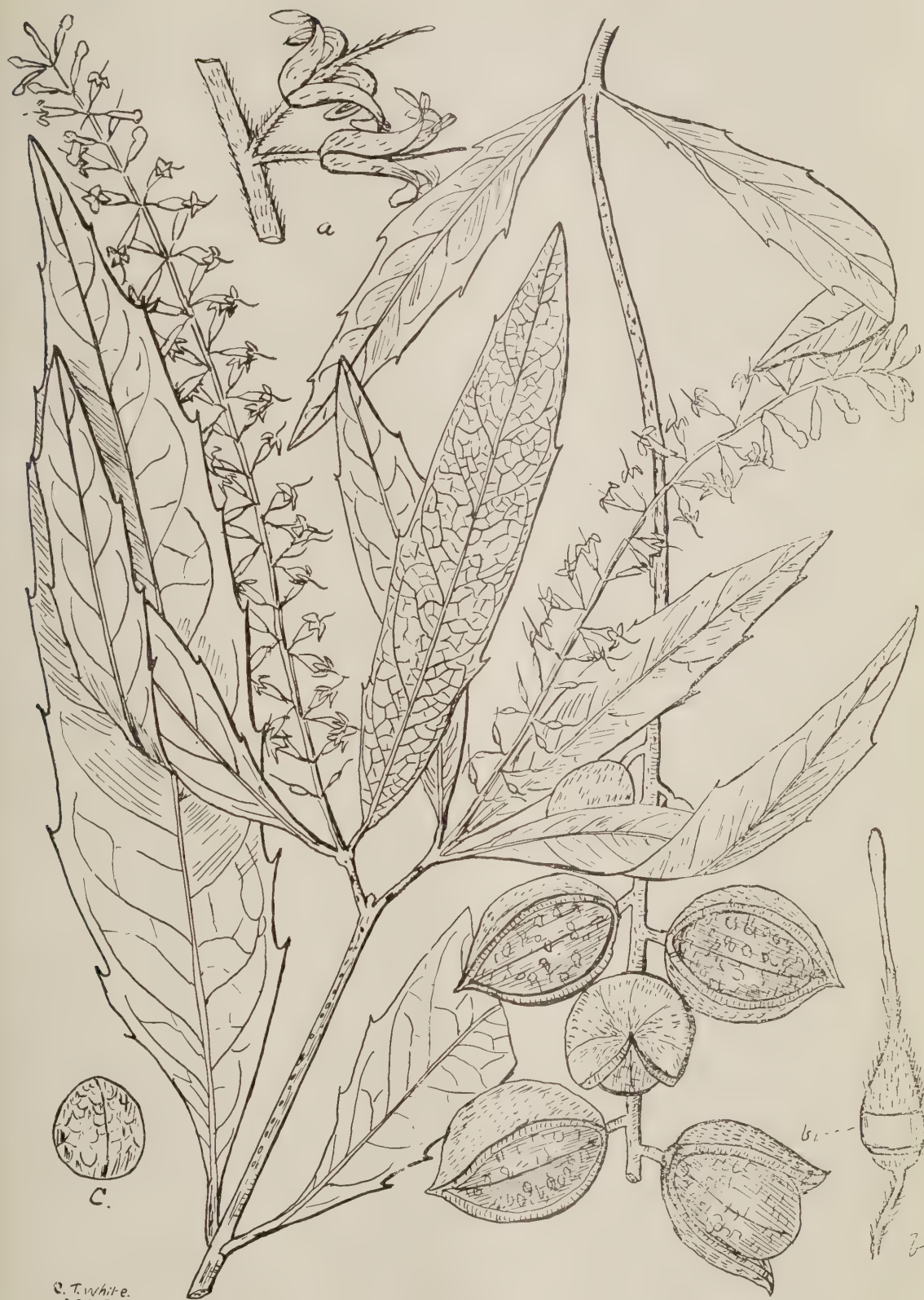
CAPPARIS ORNANS, F. v. M.



CAPPARIS AREOLATA, Bail.—(a) petal; (b) stamen; (c) stipes and ovary; (d) front, back, and side view of a calyx valve; (e) seed; (f) section of seed.



EUGENIA SIMMONDSII, *Bail* --(a) a petal; (b) flower; (c) fl. buds; (d) longitudinal section of a flower, pet. and all the stamens except two removed; (e) fruit (nat. size).



MACADAMIA LOWII, Bail.—(a) two flowers on the rachis; (b) pistil; (b₁) hypogynous glands united in a ring; (c) a nut, showing putamen.

U. europæus, *Linn.* The European Furz, Gorse, or Whin. A shrub from 2 to 6 ft. high, the branches ending in short thorns. Leaves lanceolate or reduced to thorns 2 to 6 lines long. Flowers about 6 lines long, solitary in the axils of the leaves on the preceding year's shoots, forming showy racemes, interspersed with thorns at the end of the branches. Calyx yellow, like the petals and but little shorter, clothed with brownish hairs, with a small, broad bract about 1 line long on each side at the base, besides a similar bract under the short pedicel. Petals narrow.

Hab.: Europe, on sandy and stony land; now become naturalized on the Darling Downs, *H. A. Longman* (Goowoomba).

Order MYRTACEÆ.

EUCALYPTUS, *Sher.*

E. siderophloia, *forma decorticans*, *Bail.* Naked Top Ironbark (Bancroft). This tree resembles the common narrow-leaved forms of the species, differing principally in the bark of the branches even when as thick as a man's arm, being deciduous. This feature does not seem to have been previously recorded of any variety of *E. siderophloia*, but Baron Mueller mentions two instances of it occurring in *E. crebra*, once on the Darling Downs and another time on the Sutton River.

Hab.: Eidsvold, *Dr. T. L. Bancroft*.

EUGENIA.

Eugenia Simmondsiæ, *Bail.*, *Ql. Agri. Journ.* XXIII., 297. (Plate XIV.) Inflorescence, not then available, since supplied. Flowers small, in short panicles of about 8 or 9 racemes of 3, terminal, buds bright glossy-brown. Calyx-lobes scarious, rotund ovate, about 2 lines diameter. Petals white, twice the size of sepals or nearly so. Stamens flexuose and very slender, 4 or 5 lines long. Style length of stamens.

Hab.: Tambourine Mountain, *Mrs. Simmonds*.

Order PROTEACEÆ.

MACADAMIA, *F. v. M.*

M. Lowii, *Bail. sp. nov.* Maroochie Nut. (Plate XV.) A tree glabrous, except the inflorescence, from 15 to 20 ft., often forming from 6 to 20 stems from a hard, spreading, flattish, woody rhizome, several of these stems have been observed to die after fruiting. Branchlets slender, of a glossy purple dotted with white lenticels. Leaves of thin texture, opposite or in whorls of 3 or 4, undulated, somewhat linear-lanceolate, with distant fine prickly teeth or entire, the laminae tapering at the base almost to the branchlet, from 3 in. long and $\frac{1}{2}$ in. broad to $5\frac{1}{2}$ in. long and 1 in. broad. Inflorescence in the upper axils, racemes about 6 in. long, very slender, more or less clothed with short hispid hairs; pedicels slender, about 2 lines long, and scarcely any longer on the fruit; the hypogynous glands united in a ring. Ovary villous. Fruit near 1 in. diameter, rather prominently pointed and ribbed, the putamen of a dark glossy-brown, rugose.

Hab.: Maroochie (Yandina), *John A. Low*. I have referred to this plant before, particularly in *Botany Bulletin*, No. XL.

Order NAIADACEÆ.

NAIAS, Linn.

N. major, *All.*; *var. intermedia*, *A. Br.* Leaves narrow-linear, on each side of the margin, with 5 to 7 large teeth, which are generally longer than the blade is broad; sheath on each side with 1 to 4 teeth. Fruit 3 to 4 millim. long.—*Alex. Braun. Journ. Bot.* 11, 276.

Hab.: Lake Cootharaba, *Jas. Keys*. Also met with in the North and East of Europe. (Determined by *Mr. C. H. Wright*, of Kew, England).

Order GRAMINEÆ.

ANDROPOGON, Linn.

A. sericeus, *R. Br.*; *var. geniculatus*, *Bail. n. var.* Stems slender, glossy, 6 to 15 in. high, with few erect branches. First internode 1 to 3 in. long, bent like the knee; nodes prominently silky. Leaves narrow, hairly at the orifice and border of sheath, usually clothing most of the stem. Ligula prominent, more or less ciliate. Spikes slender, about 1 in. long, usually 6 to 7 or more. Awns about 1 in. long, very slender, of a glossy-gold colour. Outer glumes much striate, and more or less silky with fine soft hairs.

Hab.: Winton, *Thos. G. Wright*.

Order FUNGI.

The two following fungi have been determined for me by *Mr. G. Masee*, of Kew, England:—

DIPLODIA, Fries.

D. pinea (*Desm.*), *Kick.* Perithecia globose-papillulate, erumpent, disposed insinuate series; ostiole at length deciduous, sporules oblong, 35-40 by 16-18 μ . Stipitella continuous, 1 septate, hardly constricted, sooty.

Hab.: On a cultivated pine (*Pinus*), in Brisbane. On various species of the same genus and *Alies*, in Europe.

CINTRACTIA, Cornu.

C. patagonica, *Cke. et Mass.* Sori in spikelets, usually confined within the glumes, but some times attacking them at their base, at first bullate, then powdery, and the black spore powder frequently dusted over the entire inflorescence. Spores dark-brown to olivaceous, globose to ellipsoid or ovoid, abundantly covered with minute tubercles 7-10 μ diam., or 9-11 by 7-9 μ , occasionally 12 by 9 to 13 by 10 μ . (*McAlpine*.)

Hab.: On spikelets of *Prairie Grass* (*Bromus unioloides*), Logie Plains, Warra. Received from *Messrs. E. Rich & Co.* Under the name of *Ustilago bromivora*, (*Tur.*, *F. v. W.*, in his "Smuts of Australia," *Mr. McAlpine* records this fungus as occurring on *Bromus* spp. in New South Wales, Victoria, and South Australia.

Order ALGÆ.

The following are a few additions to the Queensland Algæ, determined for me by *Mr. A. D. Cotton*, of Kew, England:—

FAMILY CLADOPHORACEÆ.

Rhizoclonium riparium (*Roth.*) *Harv.*

Hab.: Dunk Island, *E. J. Banfield*.

Blodgettia australis, *J. Ag.*

Hab.: Coolangatta, *J. H. Simmonds*.

Boodlea sp., *A. D. Cotton*.

Hab.: Dunk Island, *E. J. Banfield*.

Spongocladia vaucheriaeformis, *Aresch.*

Hab.: Dunk Island, *E. J. Banfield*.

Valonia Ægagropilla, var. *australis*, *J. Ag.*

Hab.: Dunk Island, *E. J. Banfield*.

FAMILY SPONGODIACEÆ.

Codium elongatum, *Ag.*; a thin form, *A. D. Cotton*.

Hab.: Dunk Island, *E. J. Banfield*.

FAMILY GIGARTINACEÆ.

Erythroclonium sonderi, *Harv.*

Hab.: Dunk Island, *E. J. Banfield*.

FAMILY RHODYMENIACEÆ.

Sebdenia maculata (*J. Ag.*), *De Toni*.

Hab.: Dunk Island, *E. J. Banfield*.

FAMILY DELESSERIACEÆ.

Caloglossa mnioides, *Harv.* (Cells slightly smaller than usual, *A. D. Cotton*.)

Hab.: Brisbane River, *C. T. White*.

FAMILY BONNEMAISONIACEÆ.

Pollexfenia lobata (*Lamour*), *Falkenbera*.

Hab.: Dunk Island, *E. J. Banfield*.

FAMILY PTEROSIPHONIEÆ.

Vidalia spiralis, *Lam.*

Hab.: Dunk Island, *E. J. Banfield*.

Lenormandia spectabilis, *Sonder*; *L. latifolia*, *Harv.*

Hab.: Dunk Island, *E. J. Banfield*.

FAMILY GRETELOUPIACEÆ.

Halymenia Floresia (*Clem.*), *De Toni*.

Hab.: Dunk Island, *E. J. Banfield*.

Thamnoclonium Tissotii, *Weber*. In a former notice the name *Curdia laciniata*, *Harv.*, was given for this plant, by mistake.

Hab.: Dunk Island, *E. J. Banfield*.

FAMILY SQUAMARIACEÆ.

Amphiroa granifera, *Harv.*

Hab.: Dunk Island, *E. J. Banfield*.

Apiculture.

THE BLOSSOMING OF THE EUCALYPTUS AND ITS INFLUENCE ON THE PRODUCT OF THE HONEY-BEE, FROM A COMMERCIAL STANDPOINT.

We had, not long ago, to remark upon the singular reticence of most of those engaged in farming pursuits, and in what may be called the minor rural industries. Amongst these are poultry-breeders, bee-keepers, nursery-men, pig-breeders, flower-gardeners, foresters, naturalists, and many others. They may make discoveries in their particular branch of industry which might be beneficial to many engaged in the same line of business, but not a word do they publish, and it is hard to get any information even by paying a visit to their holdings. It would seem as if they want to keep everything dark for fear that someone else might derive any benefit by any publicity. A few years ago we visited many parts of the State in the interests of the farming and fruit-growing community. We took photographs of the most interesting crops, machinery, stock, &c., and described the farms and the districts visited in this journal. Amongst the very interesting places visited were portions of the Blackall Range, including Nambour, Eumundi, Mapleton, Petrie's Creek, &c. From Rockhampton to Barcaldine, Cunnamulla, Thargomindah; from Cairns to Redlynch, and thence to Kuranda, Mareeba, Atherton, the Russell River, &c., we scoured the country for information subsequently published in the interests of the districts visited. What do we hear now of the life of the settlers, of their successes or failures? Practically nothing beyond a few meagre notes sent by a newspaper correspondent to some of the city and town journals, conveying the information that rain is wanted or not wanted, or that so many points fell, or that the Shire Council decided to put a culvert over a gully. As to any detailed information about crops, none is usually forthcoming except from sugar-planters. What leads us to this bit of sarcasm is that we have been asked a question about the effect of the eucalyptus on the product of the honey-bee, but bee-keepers give us no public information on anything connected with bees beyond a few items in the "Queenslander" once a week.

We can find no better answer to the question mentioned than the following extracts from a paper read at a meeting of the Royal Geographical Society in 1895 by Mr. D. R. McConnel, M.A.:—

"Bee-keepers, like all others who are engaged in rural production, should be, and to a great extent must be, observers of the out-of-doors manifestations of Nature. To them the indications of a honey-flow are all the more important because the blossoms which yield their harvest are for the most part beyond their cultivation or control. In no part of the world has it been found profitable to combine the harvesting of honey with the growing of plants to yield the nectar. The apiarist, therefore, is thrown for his returns in some measure upon the crops of neighbouring farmers, but to a far larger extent upon the wild blossoming of field and forest. His eye is on the weeds of the byways and the meadows, or scans the treetops of the woods. To him the burden of the clouds is as momentous as to the agriculturist. A heavy, sudden storm may wash out tons of nectar from the flower-cups, long-continued wet may imprison and starve his bees, and drought may wither up the sources of his spoils. It is, therefore, no idle curiosity which leads a bee-keeper to narrowly observe, and, if possible, make guiding deductions from, variations of the weather and of the efflorescence of honey-yielding plants.

"Perhaps in no part of the world is the native flora characterised by so general and abundant a secretion of honey as in Australia, and at the same time by such capricious appearance of its blossom. The former feature is remarkable, because the honey-gathering insects are comparatively few, and the native *apidæ* are for the most part too insignificant in size to fulfil the function of floral fertilisation. Probably in the case of flowering trees their fertilisation is partly secured by the crowds of honey-sucking parrots and other birds which scream and chatter among the laden boughs, and completed by the honey-eating beetles, of which there are great numbers. The uncertainty of the times of blossoming, on the other hand, is a feature more remarkable than the first, and extremely disconcerting to the apiarist. In countries of more temperate climate, furnished with a constant water supply or with more regular periods of rainfall, the honey season, if not the quantity of honey, can be depended upon with tolerable exactness. In Europe the field crops, the fruit and forest trees, the heather, have little variation in their times of blossom. In Northern America bee-keepers can count upon clover, basswood forests, or mountain sage almost to a day; and the fall brings in its regular supplement of goldenrod and other meadow and marsh plants. In Cuba and tropical South America the honey-flow is always in the winter months. In Northern Asia and in Canada the yield is governed by the annual melting of the snow. In India it appears the migratory *Apis dorsata* is sufficiently regular in its habits for its native owners to date by. But in Australia, at any rate in Southern Queensland, it is almost an abnormality for eucalypts to blossom in successive years, or within weeks or even months of the preceding time of flowering; while they will occasionally, though rarely, blossom twice in the same year—i.e., during the twelve months from winter to winter. Comparing season with season, it seems that most eucalypts would blossom normally every other year; but, through an ages-long experience of our variable climate, they have developed an excessive, one might almost say prescient, sensitiveness to meteorological conditions. They are guilty of no temerarious lavishness in their arrangements for continuing their species. In wet seasons they will scarcely blossom at all, even for two or three years. In dry seasons they will blossom year after year until the next wet period. Indeed, it may be said that the hotter and drier the season the more abundantly they flower. But the very shoots of these trees seem to wait until the last moment to decide whether they shall become tufts of new leaves or branches of honey-laden blossom; and if by any chance they have been deceived by appearances of drought into the formation of the latter, they possess the power—even after the flower-buds are apparently fully formed—of holding them month after month unopened. I have seen a grey gum (*Eu. saligna*) in my stable-yard with flower-buds that hung for thirteen months without any apparent external change until they finally burst into blossom at the end of that long time of waiting. This was during the flood year of 1893. Incredible as it may be thought, I believe that observations of gum-tree blossoming, continued through a number of years, would give data upon which fairly reliable forecasts of coming seasons could be made. For example, the last two years, reckoned from May to May, have been an unusual period of intermittent rainfall. During that time the eucalypts have occupied themselves in extending their leaf growth; but as early as April this year almost every kind of eucalypt might have been observed to be developing extraordinary masses of flower-buds, and if the season should prove dry throughout, though not an unmixed blessing to the community in general, it will bring a wealth of harvest to the hives. Old ways are still heard of by which the weatherwise could read the skies; and old-fashioned bee-keepers believed their bees knew how to forecast the coming season. There may, indeed, be more in the affinities of Nature than we think; and we may, perhaps, come to understand better her infinite mysterious sympathies when we have ceased to attack her with the egotistic mathematicism

of our day, and have learned to approach her through avenues of greater receptiveness and love.

"Besides the irregularity due to wet or dry seasons, eucalypts vary exceedingly in the normal time of flowering according to the individual kinds. *Eu. maculata* (spotted gum) flowers usually in midwinter; *tereticornis* (blue gum), about August; *crebra* (red ironbark), about September; *melano-phloia* (silver-leaved ironbark), early in December; *sidero-phloia* (grey ironbark), sometimes in December, oftener later; *corymbosa* (bloodwood), usually the latest—about March; and so on through the numerous kinds of the species. But the blossoming of individuals fluctuates much according to their distance from the coast, or position north and south. Perhaps of all the sorts in Southern Queensland, *tereticornis* (blue gum) and *corymbosa* (bloodwood) are the most constant as to the flowering time of year. It is evident then that were it not for their irregularity in blossoming eucalypts would provide an almost unequalled succession of honey-flow throughout the year. However, the varieties do not grow so near as to provide this continuity in one locality, although so many are the different kinds that hardly any wooded district could be without something approaching it. The yield of honey from most varieties is enormous. A glorious thing it is to stand beneath a towering gum-tree almost snow-white with its profusion of blossom, its vast top 'the summer home of murmuring wings.' At such times a bee-master is as glad and as busy as his bees. The quantity of nectar compensates our bee-keepers to some extent for the irregularity of blossoming. But it is not safe for them to depend upon eucalypts alone; and there are other trees and shrubs which give an equally good and, in some cases, a better quality of honey. They belong for the most part, like the eucalypts, to the myrtaceous order. And I cannot help regretting that in a late enumeration of the products of this order, made, as published, by a distinguished botanist of this city, mention was omitted of a product so valuable and distinctive as its yield of honey.

"Among the most numerous of the *Myrtaceæ* are the 'tea-trees,' all of which are rich in honey—the finest quality being obtained from those that beautify the rivers beds and watercourses, the red bottle-brush or river myrtle (*Callistemon lanceolatus*), and others. The paper-barked tea-trees (*Melaleuca leucadendron* et var.) and other swamp varieties have abundance of honey, but of a rank, objectionable flavour and smell, and dark in colour. All the *Angophoræ* (apple-trees and sugar gums) are good honey yielders—the so-called 'sugary gum' (*Angophora lanceolata*) having a peculiarly luscious, thick, though dark honey. The *Tristaniæ* are also most valuable honey producers, especially the "swamp mahogany" (*Tristania suavolens*), which has a delicate honey of delicious peachy flavour and aroma, perhaps the finest to be found in the colony. The plants mentioned all flower annually, mostly in the spring and early summer, and prefer moisture to drought, with the exception of the *Angophoræ*, which share the irregularity of the eucalypts to which they are most nearly allied. There are, besides, great numbers of flowering shrubs and trees in scrubs, which also blossom annually, and yield honey of very fine flavours and colours. So reliable are scrub flowers for a yearly yield that no beekeeper is wise to select a locality for his apiary where his bees cannot easily reach them. The marshes and swamps on the coast are covered with honey-plants, including a number of varieties of tea-trees and grass-trees, and the mangrove. But the honey gathered from such localities near the sea is very strong, salty, and dark, and I am particular in mentioning these facts because eucalyptus honey is often credited with flavours derived from inferior sources. The results of a harvest, and the market value of a season's take, will be much modified by the presence of honeys other than from eucalypts.

"Among the eucalypts themselves the quality and quantity vary very much with the tree. The product of the blue gum (*tereticornis*) has a delightful

musky perfume, very distinguishable among the hives on a warm spring evening, and a pale amber colour; but as it blossoms in late winter or early spring, the bees can seldom take full advantage of it for storing. In my experience the brightest and finest eucalyptus honey of Southern Queensland comes from the ironbarks, particularly the grey ironbark (*sidero-phloia*), and the broad-leaved or silver-leaved ironbark (*melano-phloia*), which is a stunted, crooked tree, and therefore seldom cut for timber. The bees seem to prefer the latter; I have seen them leave the grey ironbark almost untouched when both were in full blossom at the same time. The honey of the black-butt (*Eu. pilularis*) has the most unusual characteristic of not candying, even if kept for several years, probably on account of its extreme density, which gives it a jelly-like consistence and makes it difficult to be extracted from the combs.

"In none of the honeys of the eucalypts, so far as I have tested them, is there the slightest suggestion of the flavour of the oil secreted by the leaves. It is unlikely that in any of the species the oil is secreted with the honey; so that the reputed excellence of this kind of honey for medicinal purposes is probably no greater than that of any other honey, and rests on no other basis than the general emollient and nourishing properties of the article from whatever source. The much-talked-of and much deprecated 'eucalyptus flavour' seems to have originated in one of those commercial tricks which do so much damage to the interests of honest traders and producers. It will be remembered that a certain *savant* of a chemist, travelling in Tasmania some years ago, brought before the French public the 'extraordinary virtues' of the eucalyptus honey he had found in that island, dark in colour, and gathered, as he stated, by black bees about half the size of the European insect. The story went the round of the newspapers, and it appears that some persons in Sydney pricked their long ears at the prospective profits of the new trade, and purchasing a quantity of so-called 'blacks' honey, gathered sometimes on the Clarence River in large quantities by natives and shipped to Sydney in casks, poured eucalyptus oil into it until they thought it had enough of the smell and flavour of that extract, and sent it off to London. About that time there appeared in the *British Bee Journal* some paragraphs on the horrible 'eucalyptus' smell of the new Australian honey, which threatened to stink visitors out of the Agricultural Show where it was exhibited. The *British Bee Journal* is, or was at that time, 1891, edited by Mr. Thos. W. Cowan, F.L.S., F.G.S., &c., &c., a distinguished scientist who had made a hobby of microscopes and bees, a member of the famous family of paper manufacturers in Edinburgh. An uncle of mine, also with a hobby for bees, was a personal friend of Mr. Cowan's, and had written to him on the prospects of a market for his Australian nephew's honey. Mr. Cowan's reply is in my possession, in which he assures my uncle that 'if his nephew's honey is no better than the Australian honey he had seen and tasted, he (the nephew) would have a difficulty in disposing of it.' Mr. Cowan mentioned at the same time that Australian honey fetched from 25s. to 30s. the cwt., and was bought by druggists. (It was then the time of the great influenza epidemic.)"

Tropical Industries.

PROFITABLE TOBACCO-GROWING.

By R. S. NEVILL, Instructor in Tobacco Culture.

INSECT PESTS.

STEM GRUBS IN TOBACCO.

Some experiments made in destroying the stem grub in the plant beds by Mr. Charles Toon, of Toon and Kiss, tobacco-growers on Eurie Creek, Bowen, will be of interest to tobacco-growers generally, and should further trials show it to be effective, it will certainly be a great saving to the growers throughout Australia. Mr. Toon says he was able to keep his seed beds entirely free of the stem grub by spraying with the arsenate of lead—two teaspoonfuls of the lead to 1 gallon of water. The first spraying was given when the plants showed three or four leaves; he sprayed again four days later, and there were no stem grubs in the beds so treated, while the beds not treated were badly infested as were those of his neighbours. On examination of the treated plants he says he found dead grubs just entering the stem of the plant, and also dead ones that had effected an entrance, but in no instance did he find any alive, and all had died before doing any injury to the plant. Mr. Toon is quite convinced the remedy is effective, and it is to be hoped other growers will find it so.

The following remedy (taken from "The Western Tobacco Journal") might be tried on beds to prevent the stem grub, as it is simple and cheap:—"A new and what is believed to be an effective preventive method to circumvent the ravages of the troublesome cut worm has been discovered by an Orfordville (Wis.) tobacco-grower, which is so inexpensive and simple that it ought to commend itself to very general use. Here it is: Add to each barrel of water used in the transplanting about 5 oz. of ordinary carbide, such as is used in the making of gas for lighting plants, autos, &c., making the water so offensive that it is alleged that worms will not go near the plants. The remedy works so well that the discovery has been given the State Experiment Station for further trial, and it is believed that bulletins will be issued commending it to general use. The grower who first made use of this mixture says it is a sure cure. At any event, it is worth a trial. If all that is claimed for it is true, the discovery may become a great help to the tobacco-growers of the entire country."

DISEASES IN TOBACCO.

The only disease that is troublesome in Australia is Blue Mould, that mostly attacks the plants in the seed beds, though sometimes it manifests itself in the field. No sure remedy for it is known, but when it is present in the country as little watering of beds as is possible for the plants to live should be done. About one-half inch of pure sand, placed on top of the beds before sowing, will tend to conserve the warmth of the bed, thus minimise the danger of this disease, and also prevent the beds from caking when watering.

CULTIVATION OF TOBACCO.

In selecting land to be planted in tobacco, as nearly as possible it should be free from weeds and grass surrounding it, as such places serve as breeding-grounds and hiding-places for pests that may give great trouble to the farmer; it is best to have the tobacco-field between other cultivated fields, such as corn and wheat, but not near potatoes. The ground should be well and deeply ploughed during the winter, in order to destroy the insect larvæ as much as

Plate XI.



SCAFFOLDING TOBACCO.



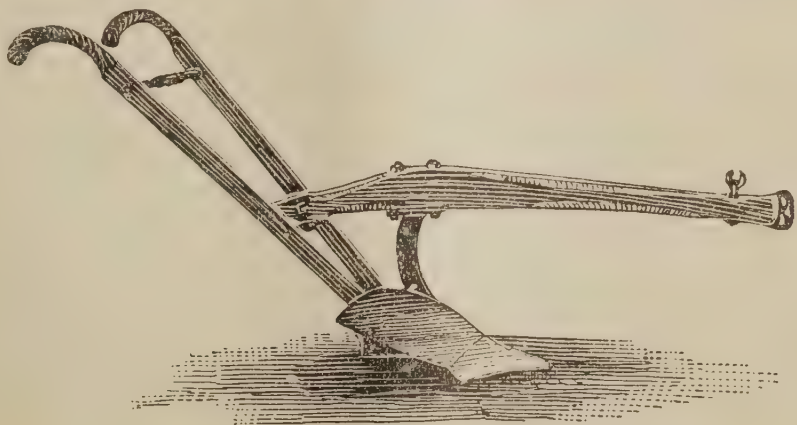
possible, and to well rot the rubbish that may be turned under; and by means of a spring-tooth harrow or a cultivator it should be kept clean until the time for planting arrives. Before transplanting, the ground should again be deeply and well ploughed, not cutting too wide a furrow—by cutting only about two-thirds of the capacity of the plough, you pulverise better; the ploughing should be fully 8 or 10 in. deep; then double harrowed, to get the ground as finely pulverised as possible.

What is known as arid cultivation should be practised in the preparation of the soil for planting—that is, ploughing should be done only a short time before harrowing. Harrowing freshly ploughed land will conserve the moisture, and the plants will live and grow better in such a soil. Land should be harrowed before lunch, or midday what is ploughed in the morning.

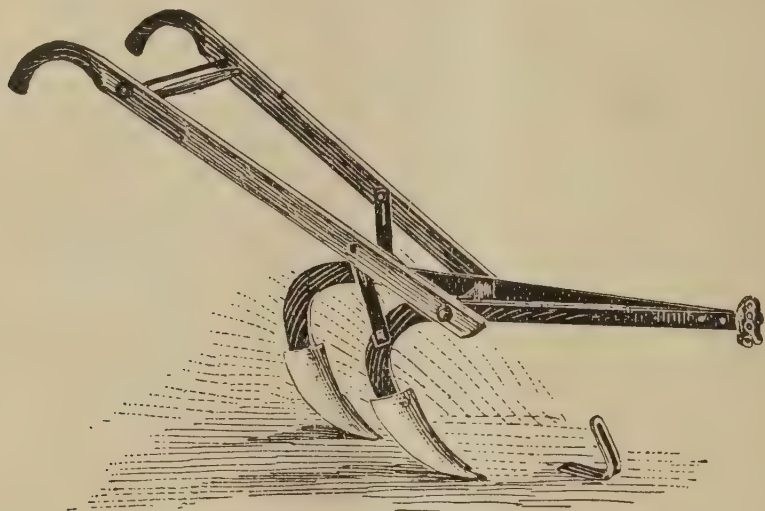
In other words, the ground should be in the best condition possible. New ground does not require so deep ploughing as old; it also gives a lighter yield and better colour. All the land intended for tobacco should be put in condition, that the farmer may be able to transplant whenever he has the opportunity. It should be checked off 3 ft. 6 in. each way to 3 ft. by 3 ft., or 3½ ft. by 2 or 2½ ft., owing to the strength of the soil, so that it can be cultivated both ways, and kept clean. It is best to transplant in showery and cloudy weather if possible, as then the plants will not need to be watered or covered; if such weather cannot be had, then it is best to do it late in the afternoon, beginning when the sun is about an hour high, watering the plants as you set them, and covering early the next morning; this covering need not remain more than five or six days. If your plant bed is very dry and hard, water it sufficiently to make the earth soft before drawing the plants from the bed, and it is best to leave all the dirt possible sticking to the roots; the roots should not be pinched or in any way mutilated. The plants should not be washed before setting. In transplanting, use a peg, made from a piece of broom-handle, sharpened at one end; this should be thrust into the ground deep enough to take the whole root of the plant; insert the root, and press the dirt well around it; do not press it about the stem, but let the dirt be thrown loosely about it. The plant should be well and firmly set in the ground, and this can be determined by taking hold of the tip of the leaf and pulling gently, and if the plant is properly set the leaf will break without the plant pulling out. When properly set, they will take root in about ten days; and as soon as this has taken place and the plant begins growing, go over the field with a hoe, chopping the weeds from the field and loosening the earth about the plant, and after this a man with a hoe is not worth his tucker in the tobacco patch, but do the cultivating with the plough.

The object of cultivation is to keep the soil in condition for supplying all of the plant's requirements, and not solely to kill the weeds.

As soon as the plant begins growing thriftily, and while quite small, take a one-horse turning plough, such as is here illustrated, which will cost 30s.,



and run with the land side as close to the plant as possible without disturbing it, thus throwing the earth away from the plant, and then across the field the same way, leaving the plant standing on a small hill; let it remain this way for three or four days, if the weather be cloudy and rainy, but if it is hot and dry the earth should be thrown back into the furrow from which it was taken in thirty-six hours. This ploughing in old land should be deep, so as to give a deep and well-pulverised soil for the roots to penetrate. After this the ground should never be allowed to pack and become hard, or get foul, but should be occasionally well and deeply stirred, first one way and then across with a double-shovel one-horse plough, cost 25s., or Planet Junior, care being taken



not to disturb the roots or break the leaves, ploughing a little further away from the plant each time. This ploughing tends to keep the earth moist, enables the roots to grow and spread, and you get a healthy, vigorous plant, the top leaves spreading and growing and ripening with the lower ones. If the weather is seasonable the last ploughing should be done with the turning plough, throwing the dirt to the plant, thus forming a hill; but if the weather is dry the level cultivation is better.

Tobacco should be topped and primed as soon as the proper number of leaves can be secured; do not wait for the bloom. You retard the development of the top leaves in waiting too long, and the plant ripens at the bottom before the top is done growing.

Priming—that is, bottom leaves taken off—leaves you less work to do, and gives the remaining leaves the full benefit of plant life. All the leaves that are damaged should be taken off; and if none or only a few are damaged, take four to six leaves, that the remaining ones may be well off the ground, then pinch out the top, leaving not more than fourteen leaves, though most good growers prefer twelve leaves. All the plants will not be ready for topping at once, and a second topping will be necessary, when every plant should be topped if it should have only six or eight leaves. Suckers must not be allowed to grow, but taken off as soon as they appear; for if allowed to grow they seriously damage the tobacco. The above is necessary in order to have the field ripen evenly, and this again is necessary to get a good cure.

In all the work done in getting out the crop and subsequent work, the idea should be to have a field of even growth, that all may be harvested at once. An important matter for the farmer to remember is not to overcrop himself, and to know that 2 acres of tobacco properly looked after will yield as many pounds and more shillings than 4 acres that have to be neglected; and that a plant topped at twelve or fourteen leaves will weigh as much as one of twenty

leaves, and not so many leaves to sucker and to look after. More pounds and a better product, more shillings and less labour, will be the result if these instructions, taken with those given in the articles on plant beds and curing, are faithfully followed.

In growing cigar leaf for wrapper, it is desirable that the leaf should be smooth, silky, and thin; therefore it should be topped higher and planted closer together than the heavy varieties. It should be topped at from fourteen to twenty leaves, depending upon the time—an early crop high and a late crop low. In the field the rows should be 3 ft. 6 in. apart one way and from 18 to 24 in. the other, the latter being determined by whether the tobacco is of a large or small variety. This can be ploughed only one way, and the hoe will have to be used if the field gets weedy. The cutworm may be destroyed by mixing treacle and Paris green with wheat bran and dropping it along in the rows two or three days before planting.

The importance of the thorough preparation of the soil for tobacco, and the thorough cultivation of the crop in the field, cannot be too strongly impressed upon the grower. Tobacco is a profitable and valuable crop, and it should be the aim of every grower to use every means available to get the best results, which means always a market and the best prices.

That the crop will grow and thrive in badly prepared ground, under favourable weather conditions, is true, but where the soil is thoroughly worked down and pulverised the quality of the product is much improved, as there seems to be something required by the plant, that is supplied by the soil, that is not to be obtained in sufficient quantities in coarse and badly prepared land. This has not only been demonstrated by experiments, but is further shown by the known fact that the best tobacco lands of all countries are those capable of the finest tilth. In this country, where seasonable rains do not always come at the desired time, the crop set in the well-prepared soil will be found to suffer least from the droughty conditions that may prevail at a critical time, for the reason it will retain the moisture better than the soil that has not been well prepared.

No plant responds more quickly to thorough cultivation than tobacco, and probably none are more improved by it in character and quality.

The field should be kept clean and in good tilth, to promote a rapid and healthful growth. This cultivation creates a dust mulch that conserves the moisture in the soil; it allows the air to penetrate it, releases any harmful gases that may have accumulated there, keeps down weeds, and destroys the hiding places of insects. This cultivation should be frequent, and commence after the first hoeing, and continue at least every ten days, until the tobacco is too large for the horse to pass between the rows without injury to the plant.

For this work a short single-tree should be used. In the pipe varieties, the plants should be so set as to allow cultivation both ways. The first cultivation should be deep and close to the plants before many roots have been formed, and for this a double-shovel plough is the best, breaking the middle well out. This leaves the ground in good condition for the roots to spread, and gives the plant the full benefit of an ample feeding surface and no dwarfed roots.

After this, frequent and shallow cultivation is desirable with the Planet for working the soil gradually towards the plant. By this gradual working the soil towards the plant, you do not create a large evaporating surface before the ground is well shaded by the plant. This is essential in this State, where the hot sun and winds cause rapid evaporation.

It should be borne in mind that the earlier the crop the better, as early crops are usually best, and cure best, and farmers should try to get out their crops as soon as possible. Australians are high-class smokers, and it should be the aim of the grower to produce what he requires, and farmers can only

secure for themselves the entire Australian market by producing a high-class tobacco. Bear in mind, Australia consumes between 12,000,000 lb. and 13,000,000 lb. of tobacco annually, and less than 3,000,000 lb. of this is produced within the Commonwealth, whereas Queensland alone could produce the whole of it.

REVIEW OF THE RUBBER MARKET FOR THE YEAR 1910.

(From the Report of Messrs. Gow, Wilson, and Stanton, Limited.)

MARKET CONDITIONS.—It can be no exaggeration to say that the past year has been the most remarkable in the history of the rubber industry since the discovery of vulcanisation.

Though the Brazilian crop last season was larger than ever before, the current demand for raw rubber was such that prices were raised to an unparalleled level, which was maintained for several months.

Consumption, however, gradually became hampered by the strain of high prices, and this, coupled with the inevitable speculation induced by the condition of business brought about a reaction in May, since when the tone of the market has been largely dominated by the stocks and the general trade outlook in America.

The highest prices ever recorded for crude rubber were made in April, when the quotation for hard fine Para reached 12s. 6d. per lb., while at the auction on the 19th of that month plantation smoked sheet realised up to 12s. 10d. per lb., and the average price of all kinds of plantation rubber sold that day was no less than 11s. 11½d. per lb. (or say one-third of the value of silver).

After the prolonged period of high quotations and generally exceptional trade conditions, the reaction has reduced prices to a basis on which manufacturers are better able to safeguard and cater for the requirements of the industry, and it is satisfactory to record that the condition of the trade generally is now far more healthy than has been the case for some considerable time past.

High prices have seriously interfered with the enormously increased powers of consumption which have been manifest during the past two years, and have had the effect of bringing into use a much larger quantity of waste rubber and other compounds. This is strikingly shown by the imports into the United States; the quantity of old scrap for remanufacture imported during the first nine months of 1910 amounted to 13,327 tons, as compared with 2,714 tons for the same period two years before. This example gives some idea of the extent to which increasing supplies of raw rubber could be handled at moderate prices by displacing these very large quantities of inferior substances to the ultimate advantage of the industry from the consumers' (as well as producers') point of view.

PLANTATION RUBBER.—London Auctions: The amount of plantation rubber offered at the London auctions during the year aggregated 95,394 packages (or 5,193½ tons), which figures compare with 50,602 packages (or 2,684 tons) for 1909.

For the period under review the average price realised at auction was the highest on record, viz., 7s. 7¾d. per lb., being no less than 1s. per lb. over the previous record established in 1909.

The following table shows the expansion of the industry during the past five years:—

**TOTAL QUANTITY AND AVERAGE PRICE OF PLANTATION RUBBER OFFERED AT AUCTION
IN LONDON DURING THE PAST FIVE YEARS.**

1st Jan. to 31st Dec.	Packages Offered.	Ceylon.	Quantity in Tons. Malaya.	Total.
1906 ...	6,462	98 $\frac{1}{2}$	250 $\frac{1}{4}$	348 $\frac{1}{2}$
1907 ...	15,380	192 $\frac{1}{2}$	621 $\frac{1}{2}$	814
1908 ...	24,647	290	1,005 $\frac{1}{2}$	1,295 $\frac{1}{2}$
1909 ...	50,602	432	2,252	2,684
1910 ...	95,394	761 $\frac{1}{4}$	4,432 $\frac{1}{4}$	5,193 $\frac{1}{2}$

1st Jan. to 31 Dec.	Number of Packages Sold.	Average Price Paid.
1906 ...	4,130	5 6 $\frac{1}{4}$
1907 ...	7,388	4 9 $\frac{3}{8}$
1908 ...	16,018	4 1 $\frac{3}{4}$
1909 ...	40,877	6 7 $\frac{3}{8}$
1910 ...	85,438	7 7 $\frac{3}{4}$

During the past year nearly double the quantity of these grades of rubber has been received as compared with that brought to the London market during 1909. This, coupled with the fact that the average realised was higher than during the previous year causes the result, so far as importers are concerned, to be highly satisfactory.

Though there are differences of opinion as to the quality of plantation rubber, the increasing quantities continue to be freely taken in all markets, and we are again able to refer to a satisfactory feature which has been much in evidence, viz., the disposition amongst manufacturers to contract for the crops of plantations in advance, strong inquiry having been observable even when "spot" markets were quiet.

PREPARATION.—For the past 18 months the result of experience with the rubber has induced many manufacturers to give a decided preference to that cured with smoke, it being noticeable that a premium is generally given for this preparation when properly carried out.

Thorough smoking has a preserving effect, with the result that the rubber is better able to stand the handling necessitated in manufacture and subsequent use.

The process is, therefore, strongly to be recommended, but if the premium at present offered is to be maintained, it is of course essential that the quality must be kept up.

A very important fact which cannot be too strongly brought before the notice of planters is that, on the estate the less handling rubber undergoes the better; all that is required is to wash out the impurities and reduce the coagulated rubber into the most suitable form for economical drying. There has lately been a marked tendency to roll out crepe very thin to hasten drying, but it is desirable that crepe in the finished form should be thick and even in texture, say $\frac{1}{8}$ -inch thick. Smoking carefully applied during drying is beneficial, either to sheet or any other kinds prepared.

Generally speaking, the preparation of plantation rubber now arriving shows improvement in various directions, more attention being given to factories and machinery than formerly, and the sending out of chemists to Ceylon and the Malay States to study the question on the spot has been a valuable move in the right direction which should have beneficial results.

STANDARD QUALITY.—In view of the proportions which the plantation industry is now assuming, the need of establishing and maintaining an efficient standard of quality cannot be exaggerated.

Especially in the case of what is known as "First Latex Crepe," there have been complaints on account of the streaky and discoloured nature of many arrivals. These, if continued, might affect the prospects of plantation rubber successfully competing with other grades, and estate managers must take every

possible precaution to ensure that their first-quality rubber is in fact first quality and free from any such defects as those referred to.

PARA.—As with plantation so with Para, the last complete crop has been the largest, excepting that of 1909, by nearly 1,000 tons, the sole cause being no doubt the satisfactory prices ruling.

CANE-HARVESTING MACHINERY.

Referring to an extract from the "Louisiana Planter" on the Piatt cane-cutter which appeared in the January issue of the "Queensland Agricultural Journal," Mr. Jas. A. Smith, Woondooma, North Bundaberg, writes:—

"I was much interested in reading in the journal, January, 1911, the account of the Piatt cane-cutter and the comments of the "Louisiana Planter" thereanent, and was much disappointed at the summing up with the advice to inventors to be satisfied with cutting and trashing without considering the further impossible task—in their opinion—of topping. It is owing to this advice thus tendered that I feel called upon to say that, in my opinion, the construction of a topper in connection with the cutter and cleaner is just as simple as either of the latter; not, however, on the lines suggested by the Piatt machine. The building of a machine to cut, trash, top, and leave in bundles ready for a loading machine to operate on, and also the construction of the latter, is only a matter of capital, and as there are few having the necessary capital with which to construct and alter, &c., and philanthropic enough to take the matter up—very often the men of small means have the best ideas—I would suggest that a company with, say, £1,000 capital, be formed for the purpose of constructing a machine or cane-harvesting machinery, that they employ two highly qualified engineers, and call for competitive designs or suggestions from persons who claim to have a knowledge of such machinery, offering a prize to the one whose machine would be made workable, or in proportion to the parts out of each design that might be employed in the construction of a satisfactory implement. The company's engineers to work in conjunction with each other on the perfecting of a capable machine out of the designs thus obtained. Apparently the matter of cutting and trashing by machinery has now been established fairly satisfactorily, the topping only requiring attention. I may here say that, being interested in cane culture and harvesting many years ago, I conceived the idea of such a complete machine, and experimented with the process of topping—which I considered the most difficult—to the extent that I am quite satisfied that this can be done with at least as much accuracy as most of our cane-cutters at present practice.

My design would include cutting, trashing, topping, and putting into bundles ready to be picked up by loading machine—easy of construction without picking up trash, and with which I also experimented satisfactorily—to follow and load into trucks or wagons. I do not claim for my machine that it would operate on any except cane that would be fairly well standing; but a very large percentage of our crops, not averaging more than 15 to 20 tons to the acre, seldom fall, and the now favourite D1135 cane, which grows particularly straight and clean, would answer admirably, and might be grown in greater quantities if found useful for that purpose. The machine is calculated as 6-h.p., travels over 4 acres a day, and be operated by driver only, and weighs about 30 cwt. To the question: Why, with all this knowledge, I have not built a machine? my reply is—want of philanthropy and sufficient capital to devote to a purpose by an amateur whose design would be immediately improved on and the profits snatched by a professional.

I trust that the article referred to will have no deterrent effect on inventors.

SESAMUM.

Sesamum is an oil-producing plant indigenous to India, Japan, and China, and it is grown in large quantities in those countries, as well as in Brazil and Africa. The Sesamum seed oil is imported largely into England under the name of Gingili, Til, or Teel oil. It was much used for the adulteration of butter. This oil is of a straw colour, clear and sweet; it is an excellent substitute for olive oil, and, unlike the latter, will keep for years without becoming rancid. It is largely used in cooking, and can be put to so many uses as to make it one of the most valuable oils in the world.

So far back as 1898 we printed an article by the late Mr. Lewis A. Bernays on the Sesamum plant in this journal (Vol. III., December, 1898). We now learn from "The American Review of Tropical Agriculture," a Mexican publication, edited by Prof. Olsson-Seffer, Ph.D., that some progress has been made with the cultivation of the plant in Mexico. Prof. Olsson-Seffer, in an article in that journal (Aug.-Sept., 1910), says that the Indian official returns show that over 1,000,000 acres in that country are planted with Sesamum, and that 5,000,000 lb. of seed were shipped in 1909 from the Balsas Valley region in Mexico. He also adds the following information as to the values of the seed, oil, &c., and methods of cultivation, harvesting, and expressing the oil:—

COMMERCIAL VALUE.

Both red, white, and black seeded varieties are found yielding the same colours in oil, the white being the most expensive; the average price per arroba (25 lb.) is approximately 60 cents (2s. 6d.) United States currency for seeds; the oil, however, is sold at 2 dollars (8s. 4d.) United States currency per arroba. The seed after the oil has been extracted is fed to cows, horses, hogs, and poultry, and the residue also makes one of the best fertilisers.

The refined oil from this plant, freshly expressed from the seeds, is one of the best for table use and free from any unpleasant taste; it congeals far less readily than olive oil.

In addition to its value as a food it is used as a lubricating oil, and inasmuch as the oil burns much like sperm or whale oil it is used for illumination, and the inferior qualities are also employed in soap making.

The value of growing this herb is as an adjunct to the other productions of the Mexican farmer. It is wise not to put "all eggs into one basket," and there is, perhaps, no part of the world where a greater variety of crops may be profitably grown than in Mexico.

CLIMATE AND SOIL.

The climatic and soil conditions of Mexico seem peculiarly favourable for the growth of oil seeds. Sesamum will grow in almost any soil except in very heavy clay or low damp places. It thrives best in light sandy loam, sheltered from the prevailing winds. This herb can be propagated from seeds, layers, cuttings, suckers, &c.

BOTANICAL DESCRIPTION.

It is an erect-growing herb, and reaches a height of $4\frac{1}{2}$ to 5 ft., with opposite leaves and yellow or pinkish flowers. The small flat seeds resemble a great deal the well-known "Millet" in the United States, the colour of the seed varying from white to reddish-brown or black.

PLANTING.

Sesamum is planted in May, and the preparation of the soil should include one thorough ploughing and two or three harrowings. For planting good seed should be used, tested by the ordinary method before planting; half a bushel will plant from 6 to 8 acres. The seeds are planted in hills 5 ft. apart each way, two or three seeds to a hill, and finally covered 2 in. deep.

This herb is not very susceptible to diseases which would render its yield precarious, and it possesses the advantages over other plants in not perishing very easily from neglect, as it will revive as soon as the ground around it is stirred, and will respond again to the attention bestowed upon it by yielding before.

It will be found that many a farmer who has sterile and barren land which he now thinks is utterly useless, can turn that land to good and profitable use by planting and cultivating this herb, by the very simple and inexpensive system of stirring up the soil about 1 ft. square and planting a few seeds in each hole.

HARVESTING.

The harvesting is done in the latter part of September or better in the middle of October, in order to give the seeds time for ripening. There is a difference of opinion as to the proper time for harvesting the beans. Some say that the fruit should be picked before it is quite ripe, others that it should be over-ripe; but there is a "happy medium" in all things, and common sense shows that the proper time to pick the bean is when it is well coloured and perfectly ripe. In Palestine, where the best oil is made, it is customary to keep the seeds in barns for about three weeks until they have undergone a sort of fermentation, which facilitates the extraction of the oil.

YIELD.

As much as 50 bushels of seeds have been obtained from an acre under favourable circumstances, and as much as 50 gallons of oil can be pressed from such a crop. The best grade of black *Sesamum* seed will yield nearly 45 per cent. of oil, but the average runs a little below 40 per cent.

METHODS OF EXTRACTING.

The oil is a household necessity among the Chinese, who use it for cooking, flavouring of bread and cake, as well as for other purposes. The method of extraction employed by the Chinese is very primitive, and is conducted in the following manner:—After the seeds have been picked, they are well roasted and then crushed to meal in the Chinese stone mortar ordinarily used for cleaning rice. The meal is then steamed until moist and cakey, and while still warm placed into small jute bags which, after being supported by circular iron bands, are pressed in a similar apparatus as that used for the ground-nut.

The extraction of the oil is carried on in Palestine by the use of a common large corn-crusher, and in other places by means of a Chilian mill, a powerful stone revolving upon a granite bed 7 tons in weight, and by which means the beans are thoroughly crushed before pressing. After passing through the crusher or mill, the pulp is put into rice bags, as they are of coarser texture and more open than corn sacks, and pressed in a powerful press.

By the modern method the beans are cleaned by machine and then broken between rollers; subjected to the blast of a fan to winnow out the skins, and finally packed in cloths for the press. The oil is pressed out once or twice in the cold before heated. The cold-pressed oil is almost colourless, and has an agreeable taste and smell, and serves as an edible oil.

The oil obtained by hot expression is of a darker colour, and is therefore used in the manufacturing of soap. As previously stated, the residue is a valuable oil-cake that is used for cattle-feeding purposes.

After pressing, the oil must be kept in clean vessels either of tin or earthenware, but in some places slate tanks are used. Time alone will complete the refining process, and in India it is almost six months before all the oil is obtained. It should be frequently skimmed off in a temperature of about 60 degrees.

CONCLUSION.

One of the advantages of the culture of this plant consists in its quick return of products. When the farmer in Mexico knows that he can grow and manufacture on his own farm an oil which can be used largely for household purposes—for lighting his house, for lubricating his machinery, for making soft soap, and feeding pigs, cattle, and poultry, he will greatly regret that he has not before noticed this herb and cultivated it.

[The plant thrives well in Queensland, but whether under our labour conditions it would prove a paying crop is doubtful.—Ed. "Q.A.J."]

SISAL HEMP IN QUEENSLAND.

Mr. T. H. Wells, of Farnbro', Childers, the most successful grower and producer of Sisal Hemp in Queensland, has written the following interesting and encouraging account of the industry in the February (1911) issue of the "Agricultural Gazette" of New South Wales. His suggestion as to the cultivation of Sisal on a large scale by farmers settled in groups on the land is well worthy of note. Sisal-growing on a small scale will not pay anyone. Large areas and up-to-date machinery alone will make a paying industry.

The work at Farnbro' has been carried out for several seasons exactly as described in Farmers' Bulletin No. 25, but this season much more work has been done with the same amount of labour. The average output has been raised to 300 lb. of dry fibre per hour, and the average cost of manufacture reduced to £12 per ton, and this could be further reduced by a larger use of mechanical appliances. The actual cost has, on fine days, when no extraordinary stoppage has occurred, been as low as £9 10s. per ton.

These figures must, however, be taken with caution, as a very great difference is made in the cost by the fibre content of the leaves, and also by the weight of the individual leaves. For instance, a ton of fibre extracted from leaves weighing 2 lb. each, and containing $2\frac{1}{2}$ per cent. of fibre, would cost considerably more than if it were extracted from leaves of the same weight containing 3 per cent. of fibre; and again, $1\frac{1}{2}$ lb. leaves containing $3\frac{1}{2}$ per cent. fibre would give a different result, even supposing all other conditions were equal.

This cost is not the whole cost of production, as to it have to be added the cost of growing (which entirely depends on locality, and may be from almost a nominal cost in a dry district in which there has been no great original cost for clearing, to a very high cost in a wet district where there has been a heavy cost for clearing and weeding); the cost of freights, commission, management, incidentals, and the wear and tear of machinery. Still, there is room for a handsome profit between the total cost and a selling price of £25 per ton at port.

Experience has shown that the periodical cutting of the leaves has a marked effect on the fibre content and the life of the plant. At Farnbro' the content was by this method increased nearly 1 per cent.—that is, from 2.26 to 3.11. To what extent the life of the plant is increased I cannot say, but I expect it to be two years or more, and it is probable that if the leaves were cut every three or four months the effect would be still better.

After the plants have been set out the greatest care must be taken that they are not smothered with weeds or other growth. This does not necessarily mean laborious chipping with a hoe. Not many weeds do much harm to Sisal, even when it is young, so far as robbing it underground is concerned, but they do immense harm if they crowd it and overtop it at any time; therefore, if the weeds are kept down to about the ground level it is generally sufficient, and this can be most economically done with a hook. Grasses can

be kept down with stock, preferably sheep, when the plants get about a year old. Suckers must be kept down; this is easily done with a hoe of the burr-hoe type.

It cannot be too clearly understood that Sisal, like sugar-cane, cannot be profitably grown in small and isolated areas. It must be grown in large areas on cheap land, and it lends itself eminently to the group system of farming, in which a number of small growers combine and either make contracts with the owner of a mill, or raise enough capital amongst them to put up a mill; in other words, on exactly the same principle as sugar-cane is grown in Queensland.

I estimate that twenty families in a suitable locality, growing amongst them 500 to 700 acres of Sisal, and doing all the work themselves, could earn from £150 to £200 per family, besides growing their own vegetables, milk, butter, horse-feed, and fruit. This provides for twenty men and six or seven boys.

It is, of course, possible to carry this principle even further, and for a number of such groups to have their own spinning factory. Four or five of such groups would keep a small factory going. There is a considerable demand for Sisal in Australia, a demand which would certainly increase if the supply were available; and there are also a number of very up-to-date rope and binder-twine factories in the Commonwealth at present drawing the whole of their supply of fibre from abroad.

THE PINEAPPLE AS A CATCH CROP IN RUBBER CULTIVATION.

Now that, apparently, some interest is being taken in rubber-planting in North Queensland, it is advisable that planters and intending planters should consider the important question of catch crops as a source of revenue whilst the trees are maturing. Some have suggested pineapples. Following is a very interesting paper on that crop by Dr. Ling Boon Ken, taken by the "Mindanao Herald" from the "Agricultural Bulletin of the Straits and Federated Malay States":—

What a planter may obtain from the *cultivation* of his land has long ago been aptly compared with his banking account, upon which he must not expect to draw perpetually without sometimes paying in. This principle should never be lost sight of with reference to the raising of a catch crop in the early years of rubber cocoanut cultivation.

A little consideration will suffice to show that, for the pioneer and the planter with a moderate capital, some form of catch crop raising is indispensable. Years ago, Tan Chay Yan, of Malacca, planted rubber on an extensive scale in the midst of tapioca. At that time, so little was known of the possibilities of Hevea that no one would have ventured to clear 4,000 acres and plant them with Hevea on the clean-weeding system. Even the astute Chinese of Malacca ridiculed the pioneer, but six years later they saw through their folly, and widely imitated what they had previously condemned. It can safely be said that without the aid of tapioca not 10 per cent. of the rubber land of Malacca could have been brought into existence. It is only necessary to mention the Malacca Rubber Plantations, Pegoh, and Merlimau Estates, among a host of others. In this connection I like to mention the name of Sir Walter Egerton, to whom the Chinese of Malacca are greatly indebted for sympathy and encouragement in the early days of rubber-planting. The colony owes to his foresight and common sense what success we have achieved in rubber cultivation in Malacca. I have purposely digressed a little in order to show that agricultural critics are not always correct, especially when they form opinions on mere theory.

In a special article in the "Straits Times" of 16th August, 1910, the writer absolutely condemns pineapples as a catch crop. "They ought never to be interplanted" is his dictum. Now, it is clear he was prejudiced against pineapples because he believed "this form of culture is a heavy drain upon the soil." But, curiously, he mentions gambier and pepper as suitable catch crops, and apparently approved of coffee. His reference to the Chinese planting tapioca as catch crop "since the boom" is scarcely correct. In my opinion, pineapples constitute a very convenient, suitable, and excellent catch crop under certain well-defined conditions. It is pure absurd nonsense all this talk of a drain upon the soil. Every kind of growth is a drain upon the soil. Perhaps clean weeding is as great a drain upon the soil as anything that can be done to the land. It is the same with cocoanuts. Cultivators remove everything and replace nothing, and then cry, "Cocoanuts must be heavily manured!"

But a little knowledge is enough to show that if only copra is made and taken away, we have removed from the plantation only a form of oil or hydrocarbon, which the palm has manufactured from the water and the carbonic acid gas—substances equally inexhaustible and abundant both in the soil and the air. Likewise, in the case of pineapples, the fruit is mainly a mass of water and saccharine matter—the solid substance of the soil taken up being used chiefly to form the root stock and leaves. Comparatively speaking, weight per weight, we take away much more from the soil in the case of gambier, pepper, *Coffea theobroma*, peas, beans, indigo, cardamoms, and ginger than in the case of pineapples, bananas, or tapioca. Therefore, provided we restore back the ash containing parts of the plants such as the leaves, trunks, and branches, we cannot be said to drain the land.

Under ordinary circumstances, pineapples are planted on hill slopes, often densely packed together, and the ground is kept clean weeded. In a couple of years, the surface of the land is quite denuded of humus, the loss due more to rain than to the action of the pineapple plants. Little more than cutting off the fruit is done by the cultivator, and no wonder the land is impoverished in six years. When properly cultivated, and the surface of the soil is duly attended to, pineapples are good as catch crops to be interplanted with *Hevea brasiliensis*. What are the essentials of a good catch crop?

A plant suitable as catch crop must have the following qualities:—

- (1) It can grow without interfering with the rubber or retarding the growth of the latter.
- (2) It must mature and fruit early.
- (3) It must not have woody roots, which may become liable to be the sites of disease.
- (4) It can be easily removed without much cost and without doing harm to the roots of the rubber trees.
- (5) It must not harbour diseases of an infective character.

When properly planted, pineapples fulfil the above particulars. But it is advisable not to use this form of catch crop, unless the plantation is close to a canning factory or to a town, where the fruit can be sold at a good price. Far away in inaccessible localities, the high cost of transport makes it unprofitable to use pineapples as catch crops, and this question alone should guide the planter in deciding whether pineapples are suitable or not, apart from other considerations—especially as pineapples will flourish in all localities suitable for the planting of rubber.

When a planter has decided to use pineapples, he must determine the system of spacing his rubber trees. On the whole, one must recommend wide planting, allowing for avenues 30 ft. wide and trees 15 ft. apart to form the sides. Thus planted 30 ft. by 15 ft., the *Hevea* trees will develop to the best advantage both their root and leaf systems.

The pineapples should be planted 3 ft. away from each rubber plant, and the lines should be so arranged on hill slopes that they serve as terraces to prevent too much wash from rain water. In this way, we can get in, say, about 2,000 pineapple plants in an acre. They flower in 15 to 18 months, and thus a first crop is certain in the second year. In the third year, a large and a secondary crop may be expected. After the fourth year, the crop begins to deteriorate unless the plants are properly looked after. The main cause of the deterioration is that the pineapple is purely a surface feeder, and usually the soil on which it grows has been allowed to become completely denuded, and no attempt is made to restore to the ground the decayed leaves, which in the case of pineapples will take a long time to become humus.

Financially, we may reckon the cost of cultivation up to the time of bearing—i.e., during two years—at 75 dollars per acre in Singapore. This includes clearing jungle, cost of pineapple seedlings, holing, and planting the rubber and clean weeding during two years. Of this amount, the contractor must make a profit of from 15 to 20 dollars. It is useless to attempt this cultivation except through contractors, unless good supervision—which cannot be had cheap—is available. The receipts can be put down in a tabular form:—

2nd year	...	2,000 pines at 2 cents each	40 dollars
3rd year	...	3,000 pines at 2 cents each	60 dollars
4th year	...	2,000 pines at 1½ cent each	30 dollars
			130 dollars

This means that the planter recovers the cost of planting plus 55 dollars to the good, out of which, if he will spend 25 dollars on a ton of a fertiliser such as the Perlis guano or similar substance, he will surely find that his Hevea trees will grow as well as they can possibly do. If one had the leisure and time, one could easily prove all these assertions by figures of measurements and by photographs. But, of course, if you allow an ignorant yokel to cram 3,300 pineapple plants within 1 acre and in addition thereto stick in 250 rubber seedlings, and during five years do nothing but take away pineapples and clean weed, you must expect that the soil becomes impoverished and the rubber trees are retarded in their growth.

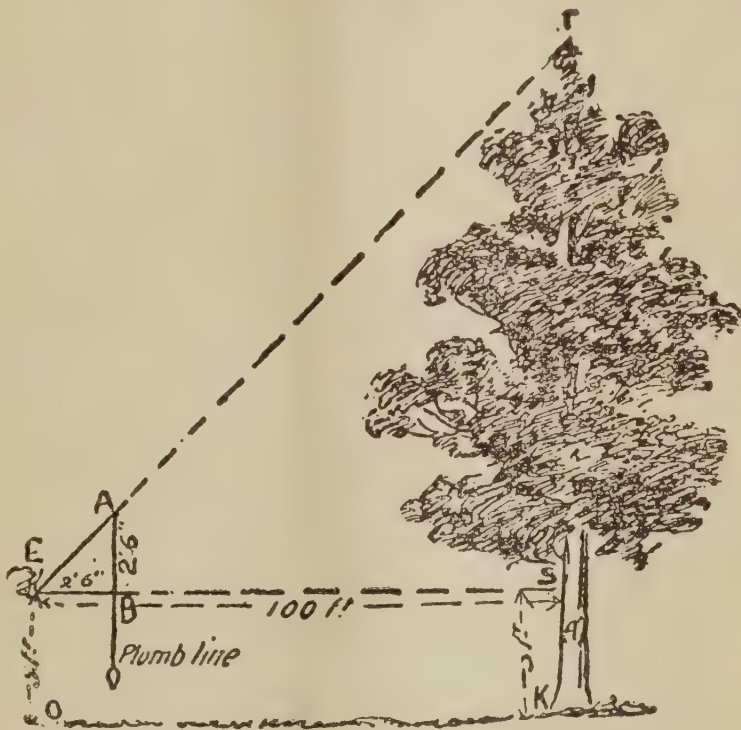
At the end of the third or at the latest at the end of the fourth year, the pineapple plants should be removed. The root stocks should be pulled up and piled in heaps till the leaves are dried. *On no account bury them in trenches*, such as some rubber experts have recommended, for within a month they will be infected with white ants. The heaps, when properly dried, should be lightly covered with earth, and set on fire and allowed to smoulder away. Care should be taken that the heaps are not too large, and that the fire should not burst into flame. *The débris becomes excellent manure, and should be broadcasted, but not buried.* The rootstocks of the pineapples will resist burning in the first instance, and they should be collected and reburned. The operation should be repeated time after time until every bit is reduced to cinders. If any planter will carry out this operation faithfully, he will find that pineapples are an ideal catch crop, especially in the vicinity of Singapore or any big town, where the fruit can be sold at a profit. The fear that the pineapples will do harm is quite imaginary, and arises solely out of ignorance of the actual conditions that obtain in ordinary pineapple culture. The harm done is due to the abuse of a catch crop, and not at all to the proper interplanting of the pineapples in the midst of the rubber.

In valuing an estate, where pineapple is used as a catch crop, it is fair and proper to take its value into consideration, if the pine plants are 3 ft. from the rubber and not more than 4 years old. Of course only the expected crop should be valued—a reasonable reduction being made for the cost of harvesting and upkeep.

Forestry.

MEASUREMENT OF STANDING TIMBER.

On this subject, Mr. L. M. Daniel, Elsternwick, in forwarding the accompanying sketch to "The Leader," writes:—"Selectors and others frequently want to find out the quantity of timber in a standing tree. The method described here will give the contents of timber in a tree, approximately, and does not take into account accurately the whole of the limbs, &c., &c. Cut a



piece of pine or deal board into a triangle (isosceles), right angled at "B." Let the observer place the long edge of the board to his eye, and move backwards or forward (on level ground) until the edge of the board exactly coincides with the top of tree, taking care that the plumb line is along edge A B, and hangs steady. Now measure from eye to butt of the tree (say 100 ft.). This distance plus the height of eye from the ground is the height of the tree. (See example in illustration.) ES or EO equals TK. ES equals 100 ft., SK or EO equals 5 ft.; therefore height of tree is 105 ft. Cubic contents of tree approximately. To find the contents of tree, multiply the square of half the diameter of tree by 3.14, and multiply this product by half the height of tree: Diameter of tree is 4 ft.; square of $\frac{1}{2}$ diameter equals $4 \times 3.14 \times 52.5$ equals 659.4 cubic feet.

For the accompanying illustration we are indebted to the "Queenslander."

Science.

SNAKE-BITE AND ITS TREATMENT.

So many cases of snake-bite have occurred during the last two months, two being fatal, that we think it advisable to republish an article on this subject which appeared in the December issue of this journal, 1905, entitled "Snake-bite and its Treatment."

A correspondent has written suggesting that, in the interests of miners, some information should be given in the journal concerning snake-bites and the best known methods of treating them. It is an undoubted fact that men engaged in mining and in prospecting run great risk from snakes, both on the surface and in abandoned shafts, which often have to be reopened; and, as such men are generally far removed from medical aid, it is well that they should know the best thing to do when anyone is bitten, and that the means to be adopted should be as clearly and widely made known as possible. Unfortunately, as far as internal remedies are concerned, investigations by competent authorities go to prove, as will be more fully explained later on, that to be armed with a reliable antidote is not nearly such a simple matter as the correspondent mentioned seems to think. He has been informed that the poison of the deaf adder acts on the nerves, while that of the black, brown, and other venomous snake acts on the blood; and suggests that the miner be made familiar with a specific for each class of bite of such a nature that he could be provided with it, and ready for any emergency. Dr. A. Muller, however, in his work on "Snake Poison: Its Action and Its Antidote," came to the conclusion, after full investigation and experiment, that all snake venom is a nerve poison; but Professor Martin, who, when in Australia, also made a study of the subject, seems to draw some distinction, inasmuch as he refers to the futility of the generally accepted remedies to prevent the clotting of blood caused by all Australian snake poisons except that of the deaf adder. Dr. Muller advocated the strychnine cure as a remedy in all cases of snake-bite; but, as he admits that it may be necessary at some stage of the treatment to administer strychnine in doses which, in the absence of the snake poison, would be fatal, it will be seen how dangerous it might be to try such a remedy without professional aid, even if later investigations had not considerably discredited—as indeed they have—this form of remedy. As to having the right antidote available, it is true that anti-venomous serum has been mentioned in this connection, but, as one must apply the right antidote to the right snake, this remedy is hardly practical under ordinary conditions.

HOW TO DISTINGUISH NON-VENOMOUS FROM VENOMOUS SNAKES.

In cases of snake-bite, it is, of course, very important to determine whether the reptile inflicting the injury is venomous or not. Many persons have undergone much pain and often risk from heroic treatment for bites which they have supposed to be those of venomous snakes, but which a knowledge of the external characters of the different species would have shown to have been perfectly harmless. Indeed, it is believed that not a few persons bitten by harmless snakes have been killed either by fright or the treatment to which they have been subjected; while many records of recovery under certain treatment are unreliable on account of the doubt existing as to whether the reptiles inflicting the bites were really venomous.

As a matter of fact, far more of the Australian snakes are non-venomous than is generally supposed. The late Dr. Krefft, for many years Curator of the Australian Museum, Sydney, and a recognised authority on Australian

snakes, describes twenty-one innocuous and forty-two venomous snakes of this country; but of the latter, he says, not more than five species are dangerous to man or the larger animals, and these retire underground for nearly five months of the year. The four Queensland snakes which are mostly to be dreaded are the deaf adder, the black snake, the brown snake, and the tiger snake. To the miner, prospector, and ordinary bushman, many opportunities are afforded of examining dead snakes; and, with a little observation and study, he might soon be able to tell at a glance the poisonous from the harmless species.

In the first place, on opening the mouth of a non-venomous snake, a row of small teeth will be seen along each jaw, and when such a snake bites he

leaves two rows of small punctures, thus— . . . In the venomous snake,
 . . .
 . . .

these small teeth are rudimentary; and leave no marks; but towards the outer edge of the upper jaw there are two fangs, and the punctures left by the bite from these are two in number, thus— . . . These fangs, which are the means by which the poison is conveyed from the snake to the person bitten, are not always in a state of projection, and it may be necessary to press the gum down with a stick or penknife before they can be seen; but this should be done with caution, and when it is certain the snake is dead. Sometimes, however, the punctures are not sufficiently distinct for them to be accepted as a reliable guide; but where the snake is seen there are other characteristics which will assist in the identification. According to Dr. Krefft, the gape of the mouth of the non-venomous Australian snake is usually curved upwards;

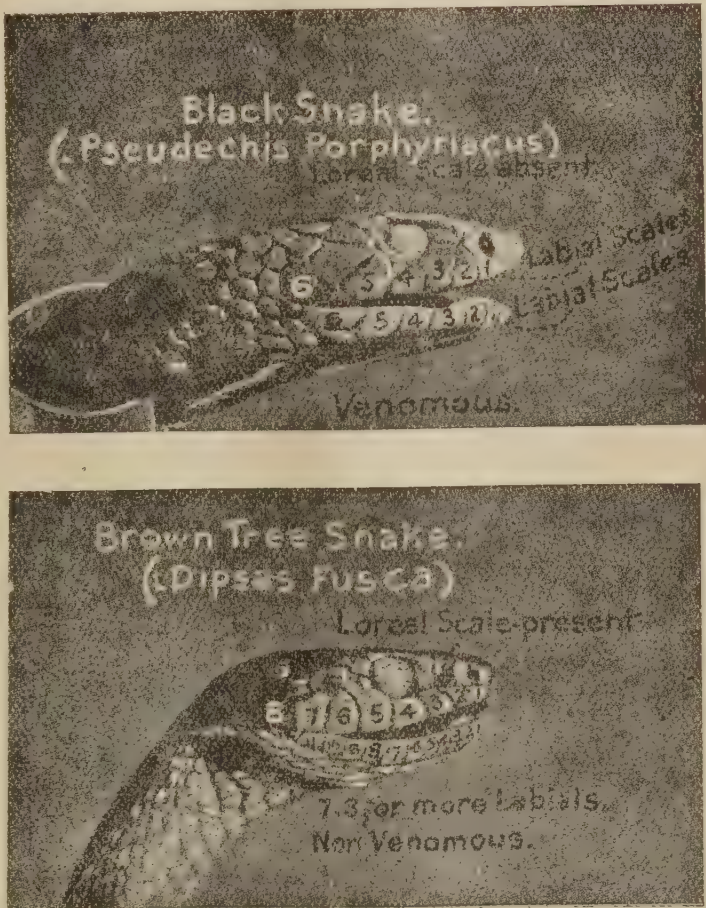


FIG. 1.—HEADS OF VENOMOUS AND NON-VENOMOUS SNAKES.

while in the venomous it forms a straight line. Again, an important distinction is to be found in the labial (lip) scales. Dr. Krefft says that of the labials there are seven or more in non-venomous snakes, while in the venomous "there are generally only six (we may say always six—never more)." He adds that "it may safely be asserted that by these shields alone can the harmless or venomous character of snakes be ascertained. This rule does not apply to sea snakes, nor to blind snakes of the family *Typhlopidae*, but to Australian venomous and innocuous colubrine snakes only." Another distinctive mark is that in the non-venomous snake there is a loreal scale, which is absent in nearly all Australian snakes. This loreal scale is a supplementary scale which, in the non-venomous snake, is to be found on the cheek between a labial scale below and a frontal scale above, and between the ocular and nasal scales. In the venomous snake these four scales—the labial, frontal, ocular, and nasal—all unite at one point, and are not separated from each other, as in the harmless snake, by the loreal scale.

The head and mouth characteristics which distinguish the two classes of reptiles can be seen at a glance from the accompanying reproduction of excellent photographs (Fig. 1) taken from Nature by Dr. John Thomson, of Brisbane, who is a keen student of this subject, and who kindly placed his pictures and other useful information readily at our disposal for the purposes of this article.

Dr. Thomson also has in his possession a diagram (in the shape of Fig. 2) showing, in such a way that "he who runs may read," the chief distinguishing features between the venomous and harmless snake. This diagram, which was originally prepared to illustrate a lecture, should be cut out, and kept by persons in the bush in some place where it may be readily and often seen, so that its points may become impressed on the mind.

TO DISTINGUISH VENOMOUS FROM NON-VENOMOUS SNAKES BY HEAD
CHARACTERISTICS (KREFFT).

<i>Venomous.</i>	<i>Non-venomous.</i>
GAPE OF MOUTH, STRAIGHT	GAPE OF MOUTH, CURVED UPWARDS
LABIAL SCALES, SIX	LABIAL SCALES, SEVEN OR MORE
LOREAL SCALES, ABSENT	LOREAL SCALES, PRESENT
BITE MARKS . . .	. . .
	BITE MARKS . . .
	. . .

FIG. 2.

Dr. Krefft states that an Australian snake that is not thicker than a man's little finger, whatever may be its length, cannot by its bite endanger the life of an adult human being. It may be added that the true *freshwater* snake is always harmless, while the saltwater or sea snakes are always poisonous. Few of the tree snakes are venomous; while the carpet snake and the so-called "green snakes" are innocuous. Very often a thick woollen sock or stocking will prevent injury from the bite of a snake, as the fang may not penetrate sufficiently far for the poison which passes down its groove to be injected beneath the skin. There is a very widely accepted belief that the deaf adder inflicts injury by a *sting* from its tail, but this is not the case.

The general symptoms exhibited by persons bitten by a venomous snake are: Great anxiety, depression and prostration, feeble and intermitting pulse, profuse cold sweats, vomiting, hurried respiration, indistinct speech, dilation of the pupil of the eye, drowsiness, and finally, in fatal cases, unconsciousness and convulsions.

TREATMENT OF SNAKE-BITE.

Professor Martin, late of the Melbourne University, who some time ago was appointed Director of the Lister School of Preventive Medicine in London, before leaving Melbourne, delivered a lecture embodying the results of several years of research into Australian snake poisons. The results of his investigations are somewhat disappointing as far as the generally accepted remedies are concerned. He says that for all snakes except the deaf adder the only remedy that is of the slightest use is the ligature, applied immediately. He adds—

“If the bite be on the tip of the finger, the ligature may be tied round the base of the finger, if done instantly. If not, we must go higher. It is no use tying anything round the wrist or forearm, nor round the leg below the knee, for in these places the limb consists of two bones, and the circulation cannot be stopped by a band of any sort. We must go above the elbow or above the knee, where there is only a single bone. The ligature must be tied as tight as possible—twisted tight with a stick—for no blood must pass. In half an hour's time the ligature may be removed.

“All the usual remedies, such as ammonia, strychnine, and chloride of lime injections, whisky, and exercise, are powerless to check the clotting of blood caused by all Australian snake poisons, except the deaf adder. Cutting out the piece and gashing the limb to make it bleed is equally futile. Antivenomous serum is a remedy, but hardly a practical one, as you must apply the right antidote to the right snake.”

Other authorities do not go so far as Professor Martin with regard to scarifying the wound and administering stimulants, and, so far as they are not likely to be injurious, these means will probably continue to be followed as extra precautions. Dr. J. Ashburton Thompson, Chief Medical Officer of the Government Health Department of New South Wales, has issued specific directions for snake-bite treatment. He first advises the use of the ligature, which is to be loosened for five minutes after the first half-hour; then tied and screwed up again. At the end of the second half-hour the ligature may be removed altogether. Dr. Thompson, in continuing his directions, says:—“In places where a ligature cannot be tied, as on the neck or face, pinch up the bitten part between the finger and thumb, and cut it out. In any case the bitten part should be cut into by numerous little cuts over and around the bite, for about $1\frac{1}{2}$ inches round, and sucked by the mouth freely and perseveringly; and this can be done without danger by any person. Stimulants, such as brandy, whisky, gin, rum, in small quantities at a time (a few teaspoonfuls), or strong tea or coffee or wine, may be given if the patient be faint.”

The removal of the ligature as described is a very necessary precaution, for at least one case has occurred in Queensland where, through keeping it on too long, mortification set in, and amputation of the arm had to be resorted to.

Professor Krefft, in his work previously referred to, says:—“The whole treatment resolves itself into this: *Suck the wound, if possible, at once; apply a ligature; lacerate the punctures, and wash the part with water or urine; keep moving, and do not despond.* Half the number of fatal cases have resulted from fear, many persons having died simply because they lost heart, did not attempt to tie a ligature, or were afraid to lacerate the wound and suck it.”

A Croydon paper some time ago published particulars of a case in which a cure had been effected by rubbing vinegar into the wound; but in this case the ligature was first applied and the wound scarified. The vinegar was used in consequence of the person treating the patient having seen an extract in the “Queensland Agricultural Journal” from an Indian paper, which described experiments successfully made with it on animals which had been bitten by snakes.

Mr. John Wilson, Brisbane, says that in Ceylon he was very successful in saving the lives of coolies who were bitten by cobras or tic-polongas when picking coffee. As soon as a man was bitten, a ligature was put on above the wound, then a pin was pushed through the skin, a piece of twine was twisted round the projecting part of the pin and drawn tight. This raised the bitten part, which was cut off with a sharp knife.

The vinegar cure is described in the "Queensland Agricultural Journal" in the issues of January, 1903, January, 1904, and February, 1905. Three authenticated cases of cure of snake-bite by the vinegar treatment have been reported to us since the first article appeared in the Journal.—Ed. "Q.A.J."

EASY METHOD OF PREVENTING DEATH FROM SNAKE-BITE.

For the next three or four months snakes of all kinds will be in full vigour and activity, and although deaths from snake-bite are rare in Queensland, still those whose business takes them into the neighbourhood of swamps will run the risk of unwarily treading on a black snake in the same way as the bushman whose work lies on dry ridgy land is liable to make acquaintance with a deaf adder. Queensland snakes are, as a rule, shy, and nearly always try to escape from man, but when suddenly molested they are apt to show fight, and a deadly stroke of the poison fang may endanger the life of a victim who is far from medical help. We therefore think that a timely publication of a paper under the above heading, by Sir Lauder Brunton, Sir J. Fayer, and Dr. L. Rogers, which appeared in the Proceedings of the Royal Society (Eng.), Vol. 73, No. 494, p. 323, will be appreciated.

Following is an abstract of the paper:—

The treatment advocated in this paper is the net result of experiments made with the venoms of each main division of snakes, including especially that of the cobra. The Australian black and brown snakes belong to the same family as the Indian cobra, and the venoms of all these snakes, it may be parenthetically remarked, have the effect of clotting the blood of any person or animal bitten. The venom of deaf adders does not have this effect.

The experiments show that if cobra venom be mixed with a 1 per cent. solution of permanganate of potash the activity of the poison is destroyed and it becomes innocuous. Further, that if a solution of the permanganate be injected into the tissues close to the place where snake venom has been just previously injected, say within from one or two up to five or even ten minutes after the injection of the venom, either no symptoms of snake-poisoning occur or a fatal result is averted, and the poisonous effects are more or less mitigated.

The result varies according as the interval which elapses before the antidote is applied is longer or shorter, and is successful in the same measure as the permanganate is actually able to overtake the venom and mix with it before it has been absorbed by the system. *For whatever part of the venom is brought into actual contact with the permanganate is rendered inert and harmless*, whilst the antidote has no effect whatever on that part which has been actually absorbed into the system. It is therefore of no use taken internally, and of very problematic value if applied to or injected into the snake-bite after any considerable lapse of time, especially if no ligature has previously been applied to stop the circulation in the locality of the bite.

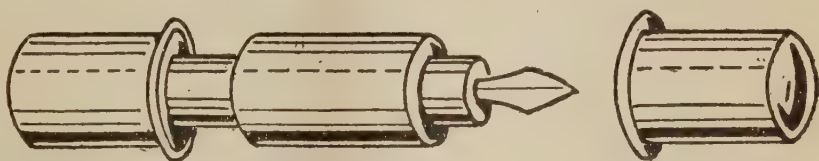
It is estimated that the solid permanganate of potash will neutralise its own weight of venom when directly mixed with it, either solid or in a solution; moreover, it acts on every class of venom, including that of deaf adders, &c.

Snake venom is cumulative in its action, which means that the ultimate effect is always that of the whole quantity of venom injected into the body and left undestroyed in the wound, and therefore certain to be eventually absorbed by the tissues; for the portion of venom first absorbed does not in any appreciable degree lose its effect as time goes on, nor is it quickly eliminated, but continues its poisonous action upon the system after the remainder of the venom becomes gradually absorbed and actively poisonous, and thus the effect increases or accumulates as the absorption progresses.

It has been estimated that the average amount of venom injected by a full-sized cobra is not more than what would equal 10 lethal doses for a man. Further, in many cases, the full dose will not actually be injected into the human tissues, for various reasons, such as the hindrance afforded by clothing, &c.

The plan now proposed is (after first ligaturing the limb by means of a strip of bandaging or other material tied loosely around it, and then twisted up tightly with a stick) to make a free opening into the site of the bite, deep enough to reach to the lowest point reached by the snake (half an inch should always be sufficient), and to rub in crystals of permanganate of potash. The punctures made by the fangs should be freely cut into, and the permanganate introduced and well rubbed round (being wetted with a few drops of water or even saliva), until the exposed tissues present a uniformly blackened appearance; or alternatively, a solution in water of the permanganate (made, say, 1 in 10 in strength) could be used as a hypodermic injection into the punctures.

Sir L. Brunton has designed a suitable instrument for use, which can be carried in the pocket. It consists of a lancet-shaped blade, about half an inch long (long enough, in fact, to reach to the deepest point of a bite by the largest snake). This is set in a wooden handle, about $1\frac{1}{2}$ inches long, which is hollowed out at the other end so as to form a receptacle to hold the permanganate. Two wooden caps are fitted on the ends, one to protect the lancet, and the other to keep in the permanganate.



It is to be noted that this treatment is directed solely against the actual unabsorbed venom in the wound. The subsequent treatment, by strychnine, alcohol, or otherwise, of any symptoms of snake-poisoning which may arise is not interfered with.

N.B.—Never let it be forgotten to loosen the ligature for a few minutes half an hour or so after it has been put on, as otherwise gangrene of the limb may cause its loss, if no worse happens.

Following is a case in point:—

Lately a lad named Chas. Heddle, in the employ of Mr. J. Gill, of Glenloughton, was bitten by a black snake (says the "Cairns Post"). Mr. Hill scarified the punctures, sucked the poison, rubbed in vinegar, afterwards permanganate of potash. After an internal application of whisky, young Heddle pronounced himself to be all right, and proved it by trying to go out and look for the reptile that bit him, with a view of revenge. Mr. Hill states that an immediate application of vinegar and permanganate of potash is a splendid remedy for snake-bite. Both liquids should be rubbed into the cuts made near the punctures.

Answers to Correspondents.

DESTROYING NUT GRASS.

"PINEAPPLE," Zillmere—

We have frequently replied in the Journal to the question as to how the eradication of nut grass may be effected, and so far the reply has been: "There is no remedy for the pest but one, and that is, by constant cultivation." In the issue of the Journal for April, 1898, you will find how one farmer succeeded in his efforts, but it took him two years before the nut grass was completely eradicated.

The farmer, Mr. Scobie (Clarence River) had 3 acres of vines badly affected by nut grass. Where it was in the open and could be got at he simply ploughed the land in the winter, and as soon as any of the grass appeared, he kept the scarifiers at work with the knives 3 or 4 in. below the soil. If the ground got hard, he gave it another ploughing. That was kept up for two years, and at the end of that time the greater portion of the nuts was dead. If any shoots appeared, a careful man went over the ground and followed the plant down and dug up the nut. The land was thoroughly cleared of the pest in two years. Another farmer had a 5-acre paddock covered with nut grass. He sowed it thickly with imphee, and killed every bit of the grass. The imphee smothered it, but it took five years to do so.

See discussion on Nut Grass at the Agricultural and Pastoral Conference, Mackay, in June, 1899. "Q.A.J.," Vol. V., Aug., p. 169.

TROUBLE WITH COWS.

NOVICE, Jondowai.—

In reply to your questions, Mr. A. H. Cory, Government Veterinary Surgeon, says:—"Some cows have what is commonly known as 'fleshy' udders. They are seldom good profitable dairy cows, and it is advisable to dispense with their services. Blind teats are fairly common, and may be caused in various ways, such as by leeches or other foreign bodies gaining entrance to the teat, or inflammation of the mucous lining, owing to some injury, &c. The treatment consists in removing the cause. To effect this, keep the teat open by means of a teat syphon, which should be placed in boiling water for ten minutes before and after use. Such a syphon can be procured from Messrs. Carl Zoeller and Co., Brisbane. In reply to question (1), I assume 'quarter' of udder is referred to. If so, pay particular attention to the stripping of that quarter when milking.

"(2) Use the teat syphon as described above. Much perseverance is necessary, and even then the treatment is not always successful. When blood is noticed, give the cow the following drench:—6 oz. common table salt; 6 oz. Epsom salts; $\frac{1}{2}$ -oz. ginger; $1\frac{1}{2}$ pints cold water. Drench carefully."

TO REDUCE BONES.

SELECTOR, Tawah Creek, Degilbo.—

Cover the bottom of a tub or hogshead with 6 in. of dry soil. On this place the same depth of bones, and cover entirely with wood ashes. Repeat these layers till the vessel is full. After exposure to the weather during the summer and winter, the whole mass can be readily reduced to powder, and thus forms a valuable manure for digging into the ground in spring.

Another method.—Instead of using ashes, if quicklime is used, and, after the receptacle is full, holes are bored in the heap and water poured down, the lime becomes slacked. The mass then becomes hot, and will remain so for two or three months, after which the bones will be friable, and the whole heap may be mixed up.

TO WATERPROOF A DUCK TARPAULIN.

The best method we can recommend is that which is used in preserving railway tarpaulins. These are given three coats of a composition consisting of pure boiled and raw linseed oil, with best quality vegetable black, in the proportion of about 9 lb. to 40 gallons. The tarpaulins should be stretched out on the floor, and each side painted once with a mixture of 2 parts raw and 1 of boiled oil, with the vegetable black added. This composition must be thoroughly worked in and then allowed to dry. The last coat, consisting of 2 parts of the boiled and 1 of the raw oil, with the black added, can then be given; but you must make certain that the tarpaulins are perfectly dry before this last coat is applied.

ERADICATION OF PASPALUM.

C.A.P., Palmwoods.—

It is quite possible to kill Paspalum by using an arsenical solution, the arsenic having been dissolved with soda. This is a strong plant poison, but it is not a good plan to use arsenic on a class of fodder readily eaten by stock; moreover, the free arsenic does not dissolve, and may bring about trouble to stock later on. Unless there is a need for solid ground on the headlands, ploughing and working them up should get rid of the Paspalum.

INJURY TO COW—DESTROYING MOSQUITOES.

D.M., Kenmore.—

1. Mr. A. H. Cory, Government Veterinary Surgeon, advises prompt and thorough treatment, as unless the wound is properly attended to the result may mean the death of the animal, or at best a chronic affection of the foot. The foot should be at once poulticed to get the sore thoroughly clean, and this should be followed by dressing with a solution of corrosive sublimate—1 part to 500 parts of water. Keep the foot dry and clean, and dress twice daily with the latter solution. When the lameness is disappearing and the cow recovering, dress the part with tar. Obtain veterinary assistance if possible.

2. The chemical used to free a dwelling from mosquitoes is—sulphur, 2 lb. to each 1,000 cubic feet. After pasting up all cracks and closing the room, leave for three hours. Or, a mixture of carbolic and camphor fused together by gentle heat (this is best made up by a chemist) and evaporated in a dish over a lamp—4 oz. to each 1,000 cubic feet.

3. In applying kerosene to tanks, use a teaspoonful to each square yard of surface. The kerosene will flow away with the surplus water, and will also blow away to one side.

HEDGE PLANTS.

H. FITTON, Kiora, Gladstone.

Of the several kinds of plants suitable for hedges, the two best for the climate of Queensland are the Privet and the *Duranta plumieri*, both blue and white. The latter makes the most rapid growth. It strikes freely from cuttings, and, owing to its sharp prickles, is seldom touched by wandering stock, and forms a dense growth. In less than three years after rooted plants are put in they will make a good hedge from 4 to 5 ft. high. If left untrimmed, the *Duranta* will grow to a height of 15 ft. Put in the rooted plants 15 in. apart and cut down to about 6 in. Cuttings should be placed at about half the distance. These latter should be 12 in. long, and only two buds should be above ground. See that the soil is pressed close to the base of the cutting. The operation should be performed in damp weather. Failing this, attention must be paid to watering until the roots have taken hold of the ground. Evergreen hedges such as these should be regularly pruned in spring, when very slight trimming is needed, and the hedge kept to a breadth of about 18 in.

The Markets.

PRICES OF FRUIT—TURBOT-STREET MARKETS.

Article.	JANUARY.	
	Prices.	
Apples (Local), per case	5s. to 8s.	
Apples (Cooking), per case	4s. 6d. to 6s.	
Apricots, per case	3s. to 5s.	
Bananas (Cavendish), per dozen	2d. to 3d.	
Bananas (Sugar), per dozen	1½d. to 2¼d.	
Cherries, per quarter-case	7s. to 9s.	
Grapes, per lb.	1d. to 2d.	
Lemons (Italian), per case	13s. 6d. to 14s.	
Lemons (Sydney), per case	6s. to 10s.	
Mangoes, per case	2s. to 3s. 6d.	
Nectarines, per case	3s.	
Papaw Apples, per quarter-case	1s. 6d. to 3s. 6d.	
Passion Fruit, per case	2s. 6d. to 3s. 9d.	
Peaches, per quarter-case	2s. to 4s. 6d.	
Pears, per quarter-case	5s. to 10s.	
Persimmons, per quarter-case	1s. to 3s. 6d.	
Plums, per quarter-case	3s. to 6s.	
Pineapples (Ripley), per dozen	10d. to 1s. 6d.	
Pineapples (Rough), per dozen	6d. to 1s. 2d.	
Pineapples (Smooth), per dozen	1s. 3d. to 3s.	
Rock melons, per dozen	1s. to 4s. 6d.	
Tomatoes, per quarter-case	1s. to 2s. 3d.	
Watermelons, per dozen	2s. to 6s.	

SOUTHERN FRUIT MARKET.

Apples (Local), choice, per case	8s. to 13s.
Apples (Cooking), choice, per case	4s. 6d. to 5s.
Apricots, per gin case	3s. 6d. to 5s. 6d.
Bananas (Queensland), per bunch	1s. 8d. to 3s.
Bananas (Queensland), per case	12s. to 13s.
Bananas (N. Queensland), per bunch	...
Bananas (Fiji), G.M., per bunch	4s. to 8s.
Bananas, (Fiji), G.M., per case	14s. 6d. to 15s. 6d.
Cherries, per quarter-case	...
Cocoanuts, per dozen	2s. to 2s. 6d.
Gooseberries, per half-bushel case	4s. to 6s.
Grapes, per 20-lb. box	4s. 6d. to 8s.
Lemons, per gin case	4s. to 7s.
Mandarins (Local), per gin case	5s. to 10s.
Mandarins (Queensland), Emperors, per gin case	...
Nectarines, per bushel case	5s. to 10s.
Mangoes (Queensland), per packer	...
Oranges, per case	7s. to 12s.
Passion Fruit, per quarter-case	2s. 6d. to 3s.
Papaw Apples (Queensland), per bushel case	4s. to 5s.
Peanuts, per lb.	5½d.
Peaches, per gin case	4s. to 6s.
Pears, per gin case	4s. 6d. to 7s.
Pears, per half-case	...
Pineapples (Queensland), common, per case	9s. to 10s. 6d.
Pineapples (Queensland), Ripley, per case	9s. to 10s. 6d.
Pineapples (Queensland), Queen's, per case	9s. to 10s. 6d.
Plums, per half-case	4s. to 5s.
Rockmelons, per gin case	2s. 6d. to 3s. 6d.
Tomatoes (Queensland), per half-case	2s. 6d. to 4s.
Water-melons (Queensland), per dozen	2s. 6d. to 8s.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JANUARY.

Article.						JANUARY.	
						Prices.	
Bacon, Pineapple ...	...	...	...	...	lb.	8½d. to 10d.	
Barley, Malting ...	...	...	...	...	bush.	2s. 1d. to 2s. 3d.	
Bran ...	...	...	...	...	ton	£5	
Butter, Factory ...	...	...	...	...	lb.	7d. to 8d.	
Chaff, Mixed ...	...	...	...	...	ton	£3 10s.	
Chaff, Oaten (Victorian dumped)	...	...	...	...	„	£4 15s. to £5	
Chaff, Lucerne ...	...	...	...	...	„	£3 to £3 7s. 6d.	
Chaff, Wheaten ...	...	...	...	...	„	£2 10s.	
Cheese ...	...	...	...	...	lb.	2d. to 4d.	
Flour ...	...	...	...	...	ton	£9 5s.	
Hay, Oaten (Victorian) ...	...	...	...	...	„	£5 5s.	
Hay, Lucerne ...	...	...	...	...	„	£2 10s.	
Honey ...	...	...	...	...	lb.	1½d. to 2d.	
Maize ...	...	...	...	...	bush.	2s. 1d. to 2s. 4d.	
Oats ...	...	...	...	...	„	3s. 2d. to 3s. 8d.	
Pollard ...	...	...	...	...	ton	£5	
Potatoes ...	...	...	...	...	„	£5 15s. to £8 10s.	
Potatoes, Sweet ...	...	...	...	...	cwt.	1s. 3d.	
Pumpkins ...	...	...	...	...	„	2s. to 2s. 3d.	
Pumpkins, Cattle ...	...	...	...	...	„	2s. to 2s. 3d.	
Wheat, Milling ...	...	...	...	...	bush.	3s. 3d.	
Onions ...	...	...	...	...	ton	£4 to £4 10s.	
Hams ...	...	...	...	...	lb.	11d. to 1s.	
Eggs ...	...	...	...	...	doz.	10½d. to 1s. 5d.	
Fowls ...	...	...	...	...	pair	2s. 6d. to 3s. 3d.	
Geese ...	...	...	...	...	„	5s. 6d. to 6s.	
Ducks, English ...	...	...	...	...	„	3s. to 3s. 6d.	
Ducks, Muscovy ...	...	...	...	...	„	4s. 6d. to 5s. 3d.	
Turkeys (Hens) ...	...	...	...	...	„	8s. to 8s. 6d.	
Turkeys (Gobblers)	...	...	...	...	„	12s. to 15s.	

TOP PRICES, ENOGGERA YARDS, DECEMBER, 1910, AND JANUARY, 1911.

Animal.				DECEMBER.	JANUARY.
				Prices.	Prices.
Bullocks ...	...	...	...	£9 7s. 6d. to £10 2s. 6d	£7 17s. 6d. to £9 5s.
Ditto (single)	...	...	...	£11 2s. 6d.	...
Cows ...	...	...	...	£7 7s. 6d. to £8 10s.	£5 15s. to £6 7s. 6d.
Ditto (single)	...	...	...	...	...
Merino Wethers	...	...	...	20s.	18s.
Crossbred Wethers	...	...	...	17s.	17s. 6d.
Merino Ewes ...	...	...	...	14s. 3d.	14s. 9d.
Crossbred Ewes ...	...	...	...	15s. 9d.	14s. 9d.
Lambs ...	...	...	...	15s. 6d.	13s. 9d.

PRICES OF FARM PRODUCE FOR JANUARY.
LONDON QUOTATIONS.

Article.	JANUARY.						Price.
Cotton (Uplands), per lb. ...	...	...	...	...	...	...	7·97d.
Cotton (Sea Island), per lb. ...	...	...	...	...	...	...	25d.
Rubber (Parà), per lb. ...	...	...	...	...	...	...	5s. 9d.
Copra (S.S.), per ton ...	...	...	...	...	...	...	£23 5s.
Copra (Ceylon), per ton ...	...	...	...	...	...	...	£26 5s.
Copra (Malabar), per ton ...	...	...	...	...	...	...	£27
Hemp (Manila), per ton ...	...	...	...	...	...	...	£19 5s.
Hemp (Sisal) per ton ...	...	...	...	...	...	...	£22 10s.
Hemp (Mauritius), per ton ...	...	...	...	...	...	...	£24 to £25 10s.
Ramie Fibre, per ton ...	...	...	...	...	...	...	£31 to £38.
Coffee (Santos), per ton ...	...	...	...	...	...	...	£53.
Soja Bean Oil, per cwt. ...	...	...	...	...	...	...	£1 13s.

Times of Sunrise and Sunset at Brisbane, 1911.

DATE.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		PHASES OF THE MOON.
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	4·56	6·45	5·20	6·42	5·40	6·21	5·57	5·47	8 Jan. ☾ First Quarter 4 20 p.m.
2	4·57	6·46	5·21	6·42	5·41	6·20	5·58	5·46	15 " ○ Full Moon 8 26 a.m.
3	4·58	6·46	5·22	6·41	5·42	6·19	5·58	5·45	22 " ☾ Last Quarter 4 21 p.m.
4	4·58	6·46	5·23	6·41	5·42	6·18	5·59	5·44	30 " ● New Moon 7 45 "
5	4·59	6·47	5·24	6·40	5·43	6·17	5·59	5·43	
6	5·0	6·47	5·24	6·39	5·43	6·16	6·0	5·42	
7	5·1	6·47	5·25	6·39	5·44	6·14	6·0	5·40	7 Feb. ☾ First Quarter 1 28 a.m.
8	5·1	6·47	5·26	6·38	5·44	6·13	6·1	5·39	13 " ○ Full Moon 8 37 p.m.
9	5·2	6·47	5·26	6·38	5·45	6·12	6·1	5·38	21 " ☾ Last Quarter 1 44 "
10	5·3	6·47	5·27	6·37	5·46	6·11	6·2	5·37	
11	5·3	6·47	5·28	6·36	5·46	6·10	6·2	5·36	
12	5·4	6·47	5·29	6·35	5·47	6·9	6·3	5·35	
13	5·5	6·47	5·29	6·35	5·47	6·8	6·3	5·34	1 Mar. ● New Moon 10 31 a.m.
14	5·6	6·47	5·30	6·34	5·48	6·7	6·4	5·33	8 " ☾ First Quarter 9 1 "
15	5·7	6·47	5·31	6·33	5·48	6·6	6·4	5·32	15 " ○ Full Moon 9 58 "
16	5·7	6·47	5·32	6·32	5·49	6·5	6·5	5·31	23 " ☾ Last Quarter 10 26 "
17	5·8	6·47	5·32	6·31	5·50	6·4	6·5	5·30	30 " ● New Moon 10 38 p.m.
18	5·9	6·47	5·33	6·31	5·50	6·3	6·6	5·29	
19	5·10	6·47	5·34	6·30	5·51	6·1	6·7	5·28	
20	5·11	6·47	5·34	6·29	5·51	6·0	6·7	5·27	
21	5·11	6·46	5·35	6·28	5·52	5·59	6·8	5·26	
22	5·12	6·46	5·36	6·27	5·52	5·58	6·8	5·25	
23	5·13	6·46	5·36	6·26	5·53	5·57	6·9	5·24	
24	5·14	6·45	5·37	6·25	5·53	5·56	6·9	5·23	6 Apr. ☾ First Quarter 3 55 p.m.
25	5·15	6·45	5·38	6·24	5·54	5·55	6·10	5·22	14 " ○ Full Moon 0 37 a.m.
26	5·15	6·45	5·38	6·23	5·54	5·54	6·10	5·21	22 " ☾ Last Quarter 4 36 "
27	5·16	6·44	5·39	6·23	5·55	5·53	6·11	5·20	29 " ● New Moon 8 25 "
28	5·17	6·44	5·40	6·22	5·55	5·51	6·11	5·19	
29	5·18	6·44	...	...	5·56	5·50	6·12	5·19	
30	5·19	6·43	...	...	5·56	5·49	6·12	5·18	
31	5·20	6·43	...	...	5·57	5·48	...	...	

Farm and Garden Notes for April.

FIELD.—The wheat land should now be ready for sowing the early wheats, and that which has not been prepared should be ploughed without delay, April, May, and June at latest being the months for sowing. The main potato crop, planted in February and March, will now be ready for a first or second hilling up. The last of the maize crop will now have been got in. Where cotton is grown, the pods will now be opening, and advantage should be taken of dry weather to get on with the picking as quickly as possible. Picking should not be begun until the night dew has evaporated nor during rain. Sorghum seed will be ripe. Tobacco also will be ripening, and either the leaves or the whole plant harvested. Lucerne may be sown, as the growth of weeds has now slackened off, but the ground must be thoroughly prepared and cleaned. Sow oats, barley, rye, wheat, mangolds, and Swede turnips. Plant out *paspalum* roots. Seed wheat of whatever variety soever should be dipped in a solution of sulphate of copper (bluestone) in the proportion of 1 lb. of sulphate to 24 gallons of water. The seed may also be treated with hot water by plunging it in a bag into hot water at 120 degrees Fahr. for a minute or two, and then into water heated to 135 degrees Fahr. Allow it to remain in this for ten minutes, moving it about all the time. Then plunge the seed into cold water and spread out to dry. This plan is useful in districts where bluestone may not be obtainable. Another safeguard against bunt, smut, black and red rust is to treat the seed with formalin at the rate of 1 lb. of formalin to 40 gallons of water. Schering's formalin costs about 2s. 10d. per lb., and is sold in bottles. It is colourless and poisonous, and should be kept where no children or persons ignorant of its nature can have a chance of obtaining it. To treat the seed, spread it on a wooden floor and sprinkle the solution over it, turning the grain over and over until the whole is thoroughly wetted. Then spread it out to dry, when it will be ready for sowing. Instead of sprinkling, dipping may be resorted to. A bushel or so of seed is placed in a bag and dipped in the solution. During five minutes the bag is plunged in and out, and then the seed is turned out to dry. Formalin is less injurious to the grain than bluestone, but, while the latter can be used over and over again, formalin becomes exhausted. It therefore follows that only the amount required for immediate use for sprinkling should be prepared. Do not sow wheat too thickly. Half a bushel to the acre is sufficient—more on poor land and less on rich soils. On light sandy soil the wheat should be rolled. On sticky land it should only be rolled when the land is dry, otherwise it will cake, and must be harrowed again after rolling. When the wheat is 6 in. high go over it with light harrows. If the autumn and winter should prove mild and the wheat should lodge, it should be kept in check by feeding it off with sheep.

KITCHEN GARDEN.—Hoe continually among the crops to keep them clean, and have beds well dug and manured, as recommended last month, for transplanting the various vegetables now coming on. Thin out all crops which are overcrowded. Divide and plant out pot-herbs, giving a little water if required till established. Sow broad beans, peas, onions, radish, mustard and cress, and all vegetable seeds generally except cucumbers, marrows, and pumpkins. Early celery should be earthed up in dry weather, taking care that no soil gets between the leaves. Transplant cauliflowers and cabbages, and keep on hand a supply of tobacco waste, preferably in the form of powder. A ring of this round the plants will effectually keep off slugs.

FLOWER GARDEN.—The operations this month will depend greatly on the weather. If wet, both planting and transplanting may be done at the same time. Camellias, gardenias, &c., may be removed with safety. Plant out all soft-wooded plants such as verbenas, petunias, penstemons, &c. Sow annuals, as carnations, pansy, mignonette, daisy, snapdragon, dianthus, stocks, candy-tuft, phlox, sweet peas, &c. Those already up must be pricked out into other beds or into their permanent positions. Growth just now will not be too luxuriant, and shrubs and creepers may be shortened back. Always dig the flower beds rough at first, then apply manure, dig it in, and after this get the soil into fine tilth. Land on which you wish to raise really fine flowers should have a dressing of bonedust lightly turned in. Wood ashes also form an excellent dressing for the garden soil. Prune out roses. These may be planted out now with perfect success. Take up dahlia roots, and plant bulbs as recommended for March. Layers that have made sufficient roots should now be gradually severed from the plant, and left for a fortnight before potting, to ripen the young roots.

Orchard Notes for April.

THE SOUTHERN COAST DISTRICTS.

The gathering and marketing of citrus fruit, as well as of pines, bananas, custard apples, persimmons, &c., is the principal work of the month. In the Notes for March attention was drawn to the necessity for keeping all pests in check, particularly those attacking the ripening fruit. As it is the height of folly to look after the orchard thoroughly during the growing period of the crop and then to neglect the crop when grown, every possible care must be taken to keep the fruit fly, peach moth, black brand, or other pests that destroy or disfigure the fruit in check, and this can only be accomplished by combined and systematic action. Citrus fruit at this time of the year often carries badly, as the stem is tender, easily bruised, full of moisture, and, consequently, very liable to the attacks of the blue mould fungus, which causes specking. The loss from this cause can be lessened to a considerable extent by carefully attending to the following particulars:—

- 1st. Never allow mouldy fruit to hang on the trees or to lie about on the ground. It should be gathered and destroyed, so that the countless spores which are produced by the fungus shall not be distributed broadcast throughout the orchard, infesting many fruit, and only waiting for a favourable opportunity, such as an injury to the skin by an insect or otherwise, combined with favourable weather conditions (heat and moisture), to start into growth.
- 2nd. Handle the fruit carefully to prevent bruising. Cut the fruit, don't pull it, as pulling is apt to plug the fruit—that is to say, to either pull the stem out or injure the skin round the stem—and a fruit so injured will go mouldy.
- 3rd. Sweat or dry the fruit thoroughly; if the weather is humid, laying the fruit out in the sun on boards or slabs is a very good plan.
- 4th. After sweating, examine the fruit carefully, and cull out all bruised or punctured fruit, and only pack perfectly sound dry fruit. It is better for the loss to take place in the orchard than for the loss to take place in the case in transit.

- 5th. If the mould is very bad, try dipping the fruit for a few seconds in a 2 per cent. solution of formalin. This will kill the spores, and if the fruit is placed in the sun and dried quickly before packing there will not be much chance of its becoming reinfested.

Don't gather the fruit too green, especially such varieties as the Beauty of Glen Retreat Mandarins, as immature fruit spoils the sale of the good article.

If the orchard has not been cleaned up after the summer rains, do so now; and do any other odd jobs that may be required, such as mending fences, grubbing out dead or worthless trees, cleaning out drains, &c.

Strawberry planting may be continued, and where new orchards are to be planted continue to work the soil so as to get it into the best possible tilth.

THE TROPICAL COAST DISTRICTS.

Clean up the orchards after the rainy season. Look out for scale insects, and cyanide or spray for same when necessary.

Go over the trees carefully, and when there is dead wood or water sprouts remove them. If bark fungus is showing, paint the affected branches with the sulphur and lime wash. Clean up bananas, pineapples, and other fruits, as after the end of the month it is probable that there will not be any great rainfall, so that it is advisable to keep the ground well cultivated and free from weeds, so as to retain in the soil the moisture required for the trees' use during the winter months. Keep bananas netted; destroy guavas wherever found.

THE SOUTHERN AND CENTRAL TABLELANDS.

If the orchards and vineyards have not already been cleaned up, do so. Cultivate or plough the orchard, so as to get the surface soil into good tilth, so that it can absorb and retain any rain that falls, as, even though the trees will simply be hardening off their summer's growth of wood, it is not advisable to let the ground dry out. When citrus fruits are grown, attend to them in the manner recommended for the Southern Coast Districts; and when grown in the dry parts, keep the land in a state of good cultivation. Should the trees require it, a light watering may be given. Do not irrigate vines; let them ripen off their wood.

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Agriculture.

CULTURAL EXPERIMENTS AT WARREN STATE FARM.

MANCHURIAN MILLETS.

The following is the report by Mr. Thos. Jones, manager, of a trial made at the Warren State Farm with two Manchurian millets—viz., Hsio-mi (white) and Hsio-mi (yellow):—

Noticing a striking account of these millets in the "Agricultural Gazette" of New South Wales, I decided to experiment with them; and accordingly applied for and obtained a small quantity of seed.

The soil chosen for planting was a rich black soil, but not very sticky. This land had been previously cropped with maize, and afterwards ploughed to a depth of 12 in., and well worked.

The millets were planted on 12th October in rows 3 ft. apart, in furrows 2½ in. deep, and during growth the soil was well worked with the horse cultivator.

The weather at the commencement of growth was very dry, no rain falling until 7th November, when 90 points were registered. When the weather broke, the rainfall registered was:—

Date.	Points.	Date.	Points.
7 November ...	90	5 December ...	12
8 " ...	160	6 " ...	75
9 " ...	1	7 " ...	75
10 " ...	3	10 " ...	21
11 " ...	55	12 " ...	200
16 " ...	6		
26 " ...	28		
27 " ...	55		

Total for Nov. 3 in. 98 pts.

Total for Dec. 3 in. 83 pts.

making a total of 7·81 in. for the three months from 12th October, time of planting, to 13th December, time of cutting.

It will be noticed from this table that the crop had a very trying time at the early stage of its growth; but, in spite of this, both varieties did well, as the following table will show:—

Variety.	Planted.	Height.	Cut.	Yield per Acre, Fodder.	Quantity of Seed per Acre.
		Ft. in.			Bush. lb.
White ...	12 Oct. ...	5 10	13 Dec. ...	11 tons	40 6
Yellow ...	12 " ...	5 2	13 " ...	10 "	46 3

It was noticed that the yellow variety ripened a little earlier than the white, but both were ready to cut for fodder in about eleven weeks.

These millets stand the dry weather exceedingly well, and they also stand wet weather well when full grown, although carrying a very heavy seed head.

Of the matured crop, only a small patch was left for testing seed, owing to the very wet weather being experienced at that time. The result of this test will also be seen in the table previously given.

Both varieties prove to be far superior to any of the varieties planted in close proximity, and treated in the same manner—viz., *Panicum Italica*, *P. germanica*, White French Millet, and Hog or Manitoba Millet. The Manchurian millets gave more than double the yield of any of these in both seed or fodder; and, hence, should be most valuable to farmers as summer crops—in fact, a glance at the crops of Manchurian millets growing at this farm should fully demonstrate their superiority to ordinary panicums.

RHODES GRASS (*Chloris Gayana*).

Our sincere thanks are due to Mr. Sylvester Brown, of Singleton, New South Wales, for introducing this grass into Australia (writes Mr. T. Jones, manager of Warren State Farm); and it may be of interest to the readers of the "Queensland Agricultural Journal" to know how this grass grows in Central Queensland under adverse conditions.

In experimenting with grasses, I am of the opinion that it should be done under field conditions, and not in a shady nook under the nose of the watering can or hose.

In determining which variety to grow in our grass paddocks, some thirty varieties were tried; and, after the hot, dry summer months, the only surviving ones were—*Paspalum dilatatum*, *Panicum muticum*, *Tricholena Rosea*, *Chloris truncata*, and *Chloris Gayana* or Rhodes grass. The latter has not only survived, but has grown luxuriantly through the long, dry summer months at this farm, and has been a nursery field for any animal lacking condition.

The land planted with this grass is a loose flat with clay within 3 in. of the surface on an average. Many of the green trees and all the dead trees and stumps were grubbed and burnt. Then the disc plough was used to scratch the ground between the remaining trees to a depth of from 2 to 6 in., according to the depth of soil. It was then harrowed, but could not be brought to a fine grass seed bed. The seed was sown at the rate of 2 lb. of Rhodes grass, and 2 lb. of *Paspalum* to the acre; then harrowed once. Different sections of the field have been planted at various times of the year. The seeds will remain in the ground quite sound until rain comes, and then quickly respond to it, soon covering the ground.

Unlike other quick-growing grasses, it is relished at all stages of its growth by stock, and does not deleteriously affect dairy products.

It has proved a wonderful grass for resisting drought, and will grow and remain green when all other grasses, natural and artificial, are burnt up.

The famous *Paspalum* has been the leading grass with our dairymen, but, to be successful with *Paspalum*, it requires rich soil with a regular rainfall; so its demands are beyond the Central Queenslander, inasmuch as it requires a regular rainfall. It is slow in germinating, and cannot be easily mown for hay. Not so with Rhodes. This germinates quickly, grows quickly, is relished by all classes of stock, proves to be a quick fattener, and is easily made into hay. When harvested, it has an aroma that is not easily defined—very strong, but not unpleasant. It makes good chaff, especially when mixed with lucerne. I have tested the yield per acre of hay from a small portion of our fields, and it made 5 tons 6 cwt. 21 lb.

I am pleased to state that our field of Rhodes grass (no *Paspalum* to be seen, although planted in equal quantities), 45 acres in area, has induced several farmers to cultivate it in their grass paddocks; and I feel certain that Rhodes grass will be quite as great a boon to the Central Queensland farmer as the *Paspalum* has been to the dairymen of the Northern Rivers of New South Wales [as well as to those of Southern Queensland—Ed. "Q.A.J."]

WHEAT-GROWING IN THE DRIER PORTIONS OF QUEENSLAND.

[Paper read by Mr. W. Soutter, Manager of the State Farm, Roma, at the Conference on Farming in Dry Districts, opened in Adelaide, South Australia, on 6th March, convened by South Australian Department of Agriculture.]

The utilising to the best advantage of lands with a limited rainfall is not only occupying the attention of all the leading countries of the world, but the different portions of the countries, owing to the fact that different soils, situations, and atmospheric conditions necessitate differences which preclude any centralisation of operations, and, under methods adopted, branches entered upon and crops grown successfully in one place are only partially so elsewhere.

The expansion of agricultural settlement in Queensland into the drier portions of the State, due in a great measure to the cheapness of available lands in these parts, has necessitated the attention of the Government being devoted to the task of ascertaining the most lucrative branches of agriculture for the settlers to embark upon, and the most suitable methods to adopt in connection therewith.

This opened up a great field for investigation, and as yet very little has been accomplished of what there is to be done, but so far it has been proved conclusively that mixed farming, including dairying and stock-raising, can be successfully carried out by diligent and intelligent men in districts with a rainfall of 25 in., and even under, if experienced at the right time, for stock-raising alone; the conditions which prevail in Western Queensland leave nothing to be desired, as, with very rare exceptions, sufficient rain is experienced in the summer to promote a luxurious enough growth in the natural pastures to tide the stock without artificial feeding over the winters, which are, as a rule, dry and not at all severe on them.

But it is not on this phase of the question I intend to dwell, as the suitability for this purpose has been amply demonstrated for the last fifty years; it is to the Agricultural possibilities.

Before going into the matter of experiments being conducted, results obtained, &c., I may state that at present we have vast areas devoted wholly to pastoral pursuits which would, if brought under scientific cultivation, produce ten to twenty times the revenue they are at present, and there is no doubt that in the near future these lands will be utilised in the manner they should be—viz., for wheat-growing, dairying, and general farming—as the soils are eminently adapted for such purposes.

To the future settlers in these places the investigation at present being carried out will no doubt be of value in assisting them to decide what branch to engage upon.

The country over these areas consists for the most part of plain land without timber, and coated with vegetation which makes it one of the richest natural pasturages in the world, and of lightly-timbered forest country. It is for the latter class that the intending settler chiefly makes, as the presence of timber on a holding prevents inroads being made into the exchequer for fencing or building material. Again, as a rule, the forest country affords more protection for his stock, provides shelter to his crops from winds, thereby reducing evaporation for same reason. The soil is also considered to be more easily worked, more retentive of moisture, and to be capable of producing crops under methods which would spell failure on the heavier soils on the exposed areas.

The portion of these lands which is coming under closer settlement at the present time is situated on the Southern and Western Railway, and is

called the Maranoa; and it is to the possibilities of this district as a wheat-producer under scientific cultural methods to which attention is at present directed.

For a number of years Agriculture has been practised with medium success in many portions of it. In the year 1881 a sample of wheat was shown at the Melbourne Exhibition, where it secured second prize; in 1891 it was calculated that 600 acres were under this cereal; and in 1904 38,000 acres were sown with this crop for an average return of only slightly over 9 bushels per acre.

This is not by any means the only crop. Vines, stone and citrus fruits, potatoes, sorghums, millets, dates, and others too numerous to mention are grown over an area of 3,000 acres to perfection; and dairying is now occupying the attention of many, and promises to become a great industry in the very near future. Owing to the great expansion in this district, of which the town of Roma is the centre, it was decided by the Government to establish an experiment farm, which was done in 1906, in order to investigate the problems which kept arising as well as for the purpose of ascertaining the most suitable methods to adopt and best crops to grow in order to obtain the maximum return from the soil.

Climate.—A few notes on the climatical conditions before proceeding may prove interesting. The year, as in all countries, is divided into the four seasons, though the distinction is so small as to really leave only two.

Summer may be stated to begin in December and end in February, during which time the thermometer reaches 100 degrees Fahr., and on rare occasions goes over. This is the season of greatest precipitation, and very often two-thirds of the total annual rainfall has been registered during these months. The evaporation which takes place has not been recorded, but must be very great. All vegetation makes extraordinary growth during the period.

Autumn includes the months of March, April, and May. In some seasons the two former are wet; but May, as a rule, is rather dry, but sufficient rain is generally forthcoming in conjunction with the moisture already in the soil in well-cultivated fields to promote germination of seed sown.

Frosts are experienced during the latter part of this month.

June, July, and August—the winter months—are, as a rule, cloudless, and the minimum thermometer sometimes drops to 17 degrees Fahr., grass temperature on low-lying situations. These are the driest months of the year, and constant drying winds are a feature.

September, October, and November is spring time, though the first is looked upon as being dry, and frosts are of frequent occurrence. In November thunderstorms are looked for. On rare occasions frosts have been experienced during this month; and when such happens enormous damage is done to the winter cereal and summer crops on low-lying and exposed situations, more especially if warm weather has been experienced beforehand.

Precipitation.—This can be stated to be erratic. In 1888, 8·86 in. were recorded; in 1890, 45·17. The average for the last thirty-eight years is slightly over 20 in. (20·3). This amount may seem large to many, but the manner in which it is experienced renders it imperative that the most scientific dry-farming methods be adopted in order to conserve it, and have it available for the plants during periods of their growth when the lack of moisture is vital.

The poor average returns obtained in this district from the wheat fields in even ordinary seasons, and the distress and restlessness it was occasioning amongst the farming community, were the deciding factors of the necessity of experiments being conducted, as it was well known that the climate and soils were both eminently suited to the production of heavier yields.

Previous to any work being entered upon, data were collected in an endeavour to ascertain the primary reason or reasons for such, and it was found to be due, not to what the majority of those engaged in the industry thought the unsuitability of the district, but to lack of suitable cultivation, propagation of undesirable varieties, unseasonable sowing, and one or two instances were met with where sowing too heavily had resulted in failure. Individual farmers were met with who had studied the conditions and had been successful in their endeavours, but they, in the majority of cases, were also growing unsuitable varieties.

The results of these investigations were a determining factor in the preparation of the syllabus of experiments to be entered upon, and, in addition to the testing of eighty-one drought-withstanding varieties of wheat, twenty-one permanent blocks, each 2 acres in extent, were laid down for the purpose of ascertaining the relative values of different depths of ploughing, methods of preparing seed bed, cultivations during growth, rates and depths of seeding, and rotation croppings. Sufficient time has not yet elapsed to warrant a statement to be forthcoming as to which system is the best, but the results as a whole prove conclusively that, even with the present appliances the farmers have at their command, the average yield can be more than doubled in even an ordinary season. The soil on the area devoted to these experiments is an admixture of loam, sand, and clay, deficient in organic matter. When wetted, it runs together and dries out like cement. The subsoil is encountered at a depth ranging from 2 in. to 8 in. It is not by any means the best in the district, and could be classed amongst the poorest. This is not stated in order to enhance results, but to prevent an erroneous impression as to the value of our Western country being gained. This character of the soil is not in any way detrimental to the success of the work of the institution, for the reason that it makes the results of the experiments of much more value than had they been better situated in this respect; and it is considered that the returns obtained can be equalled, and in many farms excelled, if the same methods are adopted in the production.

The analysis of the rainfall is as follows:—

GENERAL REPORT ON EXPERIMENTS TO DATE.

In 1907, during the twenty-eight weeks the crops occupied the ground, rain fell on twenty-four occasions, giving a grand total of 3·82 in. A good deal of this moisture never reached the roots of the plants, and probably less than 1 in. was of benefit. As it was, our cultivation experiment blocks averaged 12·7 bushels to the acre, the highest yield being 14·4 and the lowest 10·8. Had the rain which fell previous to sowing the crop been conserved in the soil, we would have had the same results as many of our neighbours, and got practically nothing. 1908 was a more favourable season, 6·23 inches being recorded during the same time, representing twenty-three wet days. The average yield obtained was 19·1 bushels, the highest being 26·7 and the lowest 13·4.

1909.—This was a wet season; moist unsatisfactory conditions prevailed in spring, and rust was very much in evidence. The rainfall was three times that of 1907 for the same period, being 11·23. The average yield was 22·1, the highest being 25·6 and the lowest 18·9.

1910.—The rainfall from 1st April to 31st October was 9·6 in., though 2·97 in., experienced in October, were of little value to the bulk of crops, as the early variety ripened by the middle of the month. No precipitation was recorded in April or May—seeding time; and when the crops were in shot blade and flowering, half an inch was recorded in six weeks. The greater portions of the crops were so destroyed by hail in October as to render the yields worthless for comparison purposes. The best obtained was 21 bushels to the acre on the portion of area furthest from the centre of the storm. The best average to date has been obtained from a block worked 6 in. deep and cultivated during the growth of the crop, the yield being 21·66 bushels, secured without the addition of fertilisers.

In conjunction with our own methods, Professor Campbell's system has been practised, a sub-surface packer being introduced from America by the Department in 1907 for the purpose. In this year, owing to the late arrival of the implement, the work was not carried out as laid down by the professor. In the following year, a crop was sown on land cultivated to a depth of 7 in., and worked as advocated by the originator of the method; but the results were rendered valueless, owing to a heavy thunderstorm resulting in a great deal of surface soil being washed away and exposing the subsoil, 1 $\frac{3}{4}$ in. being recorded in forty-five minutes.

In 1909, two varieties of wheat—Federation and J. Brown—were sown on the area fallowed in the previous season. The first-named gave promise at harvest time of returning a yield of about 30 bushels to the acre, but rust practically destroyed it, and only 2·4 bushels were obtained. The other was a splendid crop in appearance, being 6 ft. in height and very even. Rust was present in this crop to a slight extent, and resulted in a slight pinching of grain, thereby reducing the yield of grain. Notwithstanding this, 23·4 bushels per acre was averaged. No fertiliser was used.

1910.—A yield of only 12·9 bushels to the acre was obtained. The crop was of promising appearance, being nice and even, both in length of straw and in ripening. The poor yield was due to hail destroying a goodly portion of the crop.

Soil Moisture.—Owing to the fact that great interest was centred on this and other experiments in the conservation of moisture in the soil, and the many outside factors which had and which might present themselves and affect the returns of a crop and thereby prevent the value of such being ascertained, it was suggested by Mr. Brünnich, the Departmental Chemist, that such moisture analyses of soils as were deemed necessary for comparison be carried out once a month over a lengthy period, the samples to be taken at a depth of 6 in., 1 ft. 6 in., 2 ft. 6 in., and 3 ft. 6 in.

Four sites were chosen—

No. 1: Grass paddock, virgin.

No. 2: Ordinary cultivation—that is, land cropped every year.

No. 3: Land worked under Professor Campbell's dry-soil system and bare fallow every other year.

No. 4: Land worked and cropped in similar manner to No. 3, but packer not used.

The analyses for the first twelve months proved interesting, and are of great value, as they afford the most reliable illustration we could offer the farming community as to the effects of cultivation on the moisture contents in the soil. The analyses resulted as follows:—

Date.	Grass Paddock, Virgin Soil.				Cultivated Ordinary, No. 2.				Campbell's System, No. 3.				Bare Fallow, No. 4.				Rainfall, between Samples.
	6"	1' 6"	2' 6"	3' 6"	6"	1' 6"	2' 6"	3' 6"	6"	1' 6"	2' 6"	3' 6"	6"	1' 6"	2' 6"	3' 6"	
22-11-09	1.80	7.20	6.49	8.46	2.38	...	9.56	11.70	15.79	15.38	15.20	14.52	15.70	14.30	14.40	14.65	...
21-12-09	1.19	9.47	8.06	8.80	3.39	11.80	11.40	12.10	19.60	14.80	15.10	15.60	8.86	14.20	13.00	13.90	1.71
27-1-10	2.92	7.60	7.37	8.34	6.89	6.72	4.48	10.36	15.72	14.85	12.89	13.53	16.30	13.95	14.74	15.55	6.08
22-2-10	1.52	7.00	7.29	7.87	1.60	9.23	8.90	11.09	...	14.80	14.19	13.29	14.72	13.34	15.49	14.29	.67
26-3-10	9.67	12.57	12.66	10.51	8.66	17.72	18.50	13.05	11.63	18.98	15.39	16.55	15.50	14.05	13.78	13.77	7.23
19-4-10	10.56	10.29	9.78	9.73	10.62	13.84	11.89	11.29	11.87	13.54	14.89	14.73	18.65	14.4	14.01	15.65	Nil
26-5-10	1.95	10.30	10.12	9.25	3.36	14.58	12.39	13.51	11.24	15.55	15.15	16.09	...	13.94	13.16	14.20	Nil
23-6-10	6.35	12.27	10.18	11.54	15.40	14.30	11.70	13.23	14.30	16.65	15.25	15.55	17.51	14.36	14.19	15.46	2.76
26-7-10	6.98	13.80	10.9	11.32	7.57	17.56	13.43	13.93	17.75	18.29	16.19	16.18	22.20	14.80	15.52	13.86	3.43
24-8-10	3.70	16.91	10.13	10.15	5.26	15.50	13.02	14.25	8.59	14.20	14.27	16.10	13.68	13.19	13.18	13.45	.54
26-9-10	1.42	9.86	10.82	11.81	1.12	11.72	7.98	11.99	11.84	10.34	12.79	14.13	9.47	10.43	12.95	14.73	.02
24-9-10	7.60	8.60	9.00	9.94	7.46	13.64.	11.80	12.72	10.83	12.55	12.20	14.40	10.93	12.72	12.96	13.52	2.97
Average	4.62	10.49	9.4	9.81	6.14	13.32	11.2	12.43	13.56	14.97	14.48	15.06	14.86	13.57	13.94	14.37	2.35

It will be seen that the Campbell dry soil system and bare fallow are the best, as less evaporation took place during dry periods and the moisture contents showed greater increases after rain. These analyses are still being conducted. Others are being conducted in an endeavour to ascertain the depths various crops derive their moisture from, and the quantities required for their development.

Opinions Formed.—So far, results obtained in conjunction with data supplied by successful men warrant the opinion being formed that, in order to be successful, instant and systematic cultivation is necessary, deep working essential, firm seed bed must be obtained, cultivation of crops during growth should be carried out, only varieties suitable to the district be grown, quantity of seed sown to be regulated by variety and class of soil, fertilising elements must be added to some soils, rolling must be done in some cases, rotation cropping must be gone in for, and stock-raising in some form (preferably sheep, though dairying is carried on by most) must be carried out in conjunction with cultural operations.

Each of the foregoing opinions will now be dealt with separately, giving, where necessary, the reason why such was formed, and the method suggested for the carrying out of same:—

Instant and Systematic Cultivation.—This is the chief clause contained in all methods of cultivation advised for humid and dry climates, and to nowhere, probably, is it more applicable than to this State, for the reason that our season of greatest precipitation is experienced between the time of removal of one crop and the sowing of the next, and, if the land is not in a condition to admit of the rapid percolation of it, the bulk of it will run to waste, at the same time carrying with it a good deal of the best of the soil as well as the nitrogen it had become impregnated with in the atmosphere. In addition to this, as a rule, the greatest robbers of moisture—weeds—will have begun to grow in crops when just about ripening, and must be destroyed.

The first cultivation may consist of a stirring of the surface with a disc harrow or disc cultivator or a shallow ploughing, but, whatever implement is used, it must also result in the destruction of the weeds.

Previous to this, should the crop have been removed with the complete harvester or stripper, providing such crop was not rusted or smutted, when it is more desirable that the straw should be burned, the stubble should be rolled down at right angles to the direction it is intended to cultivate. Upon examination after the cultivator has been over it, the straw will be found to have been chopped up in such a manner as to permit of its being completely turned in at next ploughing, and not be left sticking out between the furrow slices, as is often the case, thereby affording a splendid avenue of escape for any moisture then remaining in the soil and a good deal of that which will go into it in the future. As soon as possible, these operations should be followed by ploughing to the full depth it is intended to go, a mould board plough being used for preference, as it leaves the ground rougher. The depth, of course, is regulated by depth of soil in many instances; but at least 4 in. should be gone and deeper, if possible, but on no account should the subsoil be brought to the surface. If the nature of the soil will not permit of this depth being ploughed, then some other

means must be employed to gain it. Within the last few years a very handy contrivance, which can be attached readily to some makes of plough, called "Kemp's subsoiling attachment," has been used for this purpose with considerable success. The implement also does away with the necessity of extra labour being engaged for subsoiling operations. The extra horse-flesh required when using it is governed by the depth worked and quality of subsoil. The land should now be permitted to be in the rough state until after the wet season. As soon as the land will carry a team after this, it should be double-discd (half lap) with disc harrow, which will have been rendered necessary owing to formation of crust and growth of weeds. This operation should be again followed by a shallow ploughing, say 4 in. deep; and each day's work should be harrowed up before ceasing for the night. From now up to seeding time all energies should be directed to the retention of moisture in the soil; the ground should be harrowed after every shower, and, if the growth of weeds renders it necessary, double-discd.

No hard-and-fast rule can be laid down with regard to what operations are essential, or what implements to use, or the time to carry them out; these are influenced by the season and the condition of the soil, and in some years twice as much working is required as in another.

The farmer must use his own judgment, which will not be a hard thing to do when he knows in what condition his field should be at seeding time to give the maximum results.

To anyone unacquainted with the extraordinarily rapid growth which takes place even in an ordinary season, the great difficulty and labour entailed in the endeavour to keep the land free of weeds is not appreciable; but the fact that in twelve weeks' time some crops, averaging 15 tons to the acre, can be grown from seed should furnish them with some enlightenment.

In a season like the one we are experiencing, when 12 in. of rain fell in January, and a team could not go on to the fields for six weeks, it is next to impossible to keep ground in condition, as freshly ploughed land, within a few days, becomes green with the vegetation peculiar to the districts. This is where sheep prove a valuable asset to the farmer, as they can be used for the purpose of keeping down this undesirable growth and thereby, to a great extent, minimise the loss of moisture which would take place if it had to remain until destroyed by cultivation, while, at the same time, they are increasing in value and enriching the paddock through the return to the soil of the unassimilated portions in the shape of their droppings.

It will be noticed, in the preceding remarks on cultivation of soil for reception of seed, that with one exception, not including the use of the sub-surface packer, the system is practically the same as that advocated by Professor Campbell. The exception is the leaving of the soil in a rough condition after first ploughing. As it is totally opposite to his teaching, the wherefore of it will be given. It is a well-known fact that different soils require different treatment, and it is also apparent that different climatical conditions necessitate different treatment for similar soils, and it is on account of these, as well as owing to the composition of the soil, that this is rendered necessary. By leaving the surface rough more

moisture is induced to go into the soil, for the reason that the unevenness is not conducive to its escaping from the surface by running off, and downwards offers the least line of resistance. Whereas, if, instead, the surface had been fined down by the use of harrows previous to the wet season when from 7 in. to 18 in. will be recorded, after a very short space of time, the small lumps will have become dissolved and the small particles run together, which not only prevent the moisture from percolating into the soil below, but result in the production of a surface which offers no inducement for the water to lodge, and, consequently, it runs away.

DEEP WORKING.

This is often written "deep ploughing," and, if taken literally, is fatal on some soils, as stated in the remarks on cultivation. Nature's methods of deep working are apparent in the form of the cracks in the soil, be the fissures large or small, and in the deep-rooting short-lived herbage. Her reasons for this must be our own. They are carried out in order to loosen, sweeten, and enrich the soil by aeration, and to renew the surface soil by erosion not in the form as we understand it, in the formation of gullies whereby the surface is removed and not renewed, but by permitting the heavy rains to percolate quickly to great depths, at the same time carrying with them particles of worn-out surface soil, which practically means that, in the natural fields, a perpetual renewal of soil is going on. Owing to the fact that most systems advocated for dry districts emphasise the necessity for preventing these features from appearing, and correctly so, as the means of ingress also present the means of egress for moisture, the work which Nature would carry out, if undisturbed, must be accomplished in some other manner; and the only course which presents itself is deep cultivation.

To the farmer in dry districts on shallow soils with impervious subsoils, this applies in a greater measure, more especially where the rainfall is experienced in the form of heavy and continuous downpours. To illustrate in what manner, it is only necessary to state that percolation of moisture in unworked soil is exceedingly slow, whereas well-worked soil permits of penetration as fast as precipitation, and a field worked 10 in. deep will absorb more than two and a-half times the moisture absorbed by a field worked 4 in. deep before overflowing. This practically makes the depth to which the soil is worked the rain gauge on the farm, as rain water which falls and runs off is no more use to the crop than that which falls on the roof and is used for household purposes.

FIRMING OF SUB-SURFACE SOIL.

On shallow-worked soils this condition is always present, but on those worked in the manner just mentioned it is not so, and must be accomplished by some means, either by depasturing stock or by rolling, which are only substitutes, as in deep-worked soils their action is not far-reaching enough, or by the more successful and thorough method—viz., use of the sub-surface packer.

In the days of the single-furrow spring plough this operation was to a more or less extent practised unknowingly, as when a second shallow ploughing was done the weight of the implement used to consolidate the previously loosened soil beneath, and can be quoted as another reason for the better

returns obtained. The necessity of this firming of the soil is in order to regulate the utilisation of moisture by crops to some extent; to avoid having any interstices, as they induce air circulation, which results in drying out of soil and sudden changes in temperature at roots of plants; to induce decomposition of organic matter; and to establish a thorough connection between worked and unworked soils necessary in order to facilitate the regular movement of moisture from one to the other. In addition to those reasons, some plants must have a firm bed for their roots in order to be healthy and developed successfully—more especially does this apply to wheat. On it the action of a loose soil produces heavy, luxuriant growth in a short space of time, which renders it very susceptible to disease, owing to the sappy condition of the structural portions, and at the same time results in it going off very quickly as soon as a dry spell is experienced owing to the fact that the growth stimulated and respiring surface produced have utilised all the available moisture in the soil. This is brought about by the easy accessibility of food and moisture in the soil by the plant; the firming of the soil compels the plant to search for food, thereby regulating its supply and producing normal growth. From this it will also be gathered that the operation results in the soil retaining its fertility much longer.

CULTIVATION OF CROPS DURING GROWTH.

These operations are very little practised, but, if the beneficial results accruing from them were once thoroughly understood, they would become universal in their application. The actual benefits derived are as follows:—The loss of moisture by direct evaporation is reduced to a minimum; the soil is always in the best condition to derive the maximum benefit from further precipitation; the growth of weeds is prevented by the drying out of the soil in which the seeds are germinating; the sending out of adventitious surface roots by the crop, which is undesirable, is prevented for the same reason; and it causes the primary roots to penetrate in a more oblique manner, thereby giving the plants a larger and more stable scope from which to derive their moisture as well as a firmer hold of the soil.

A probable benefit, which also results where crops are cultivated a number of times during a season, is the further consolidation of the soil by the weight of the horses when tramping to and fro. This might be the reason, partly, that cultivating during a dry spell is beneficial through the compacting of the voids left in the soil through the removal of water by the plants.

The implements generally used in these operations are the lever harrows, light in build, and so constructed as to enable the teeth to be set at any angle desired. The time when their use is most advantageous to a crop is as soon after rain as a team can be got on to the field without bogging. The direction of operations where seed has been sown with a drill should be across the rows, in order to reduce the possible pulling out of plants to a minimum. The age at which crops can be first harrowed without injury depends upon the implement used. If it is a heavy straight-tined harrow, it would require to be much older than if those previously recommended were employed. With the latter, if conditions render it essential, they can be cultivated ten days after appearance, providing sufficient set is given to prevent the roots being disturbed. How long these operations can be continued with advantage is practically governed by the growth of the crops. Some varieties with spreading

habit, of growth soon cover the ground sufficiently to prevent direct evaporation by the sun; at the same time their foliage prevents the harrow from stirring the surface. With erect-growing varieties, operations can be gone on with until they are 6 in. high with advantage and without injury.

SUITABLE VARIETIES.

On these the whole of the ultimate success of a farmer's operations depends, as it does not matter what energy he has expended in the preparation of the soil for the production of his crops, if an unsuitable variety is sown; then he courts failure with disastrous certainty. This is probably rather a strong statement to make; nevertheless, it is true. Not only does this apply to wheat in which it is probably more apparent, but to all crops. For this reason it is plainly evident that the endeavours to breed new varieties with the most desirable characteristics (which can now be attempted with every certainty of success owing to the coming to light of Mendal's work and subsequent investigations thereon) must be practised assiduously, since, before the real productiveness of a district can be ascertained, such varieties as are necessary will have to be produced.

The results of our variety tests give the best demonstration that no centralisation of work can be attempted; the dry-belt wheats from America are amongst the poorest yielders we have in a dry season, and amongst the best we have in a wet one; whilst those obtained from the dry districts in New South Wales and South Australia are good in a dry season, but are susceptible to rust (some in an alarming degree) in a moist one; and, to come closer to home, varieties grown with success on the Darling Downs are next to worthless in these parts. The essential features in a wheat to this district are—Its rust-resisting powers must be great; it should be stout, short-strawed, with little flag; must be of quickly maturing habit, bald, and hold its grain well. The necessities of these will be given by treating each separately.

RUST RESISTANCE.

Rust is one of the greatest scourges that this district is visited by, and, next to hailstorms and frost, it is the most sudden and disastrous in its effects. Crops with the grain partly formed, giving promise of a yield of 30 bushels to the acre, can be so injured by it in a week as to be worthless; some varieties, those with soft spongy straw, will tumble down and present the appearance of having been battered down by hail under the visitation. With other varieties the grain is pinched more or less according to their degree of resistance. As a wheat has not yet been evolved which does not take rust, the only available course open is to grow those least affected by its presence.

SHORT-STRAWED WITH MINIMUM FLAG.

A short-strawed variety is superior to a long-strawed one, owing to the fact that it is not nearly so liable to be blown down by storms, and on exposed situations, where prevailing winds are strong, they do not shed their grain to the extent taller varieties do, for the reason that they do not gain the momentum which causes the heads to knock together and thresh the grain out.

Absence of flag is more a characteristic denoting that the variety is a rust-resister and a good dry-season wheat, and is a desirable trait on that account. In addition to the foregoing reasons, it might be stated that the unnecessary production of straw and flag is of no benefit to crops being grown for grain, and only represents a waste of moisture and fertilising elements.

QUICK MATURING.

By this is meant those wheats which ripen off naturally upon the approach of warm weather. Amongst this class, some of our best rust-resisting wheats are found, as the hard straw, which is a peculiarity of such varieties, is past the stage when it is most susceptible to injury. In some low-lying situations damage results owing to this earliness in habit, resulting in crops being frosted; but this can be avoided by delaying sowing, but much better is it to sow seed of a variety maturing a little later. The growing of long-season wheats (winter wheats) is out of the question here in most years, though some seasons have been experienced when isolated good yields have been obtained from such varieties as Manitoba; but, as a rule, the sudden advent of warm weather in conjunction with the rust, which is always present in these crops, results in premature ripening off of crops with the result that the grain, if any is obtained, is very pinched and of very little value. The early sowing of such varieties does not result in their ripening any sooner, as has been proved this last season: a block sown in the last week in February ripened off at the same time as one sown in the beginning of May, with the same results.

BALDNESS.

Though the presence of awns is stated by some authorities to prevent shedding of grain in crops grown on exposed areas through their acting as cushions, it is yet a moot point whether the extra leverage offered does not more than counterbalance this. In any case the presence of awns is undesirable where crops are removed by the stripper, as they mean twice the number of trips in to the winnower for the same quantity of grain as would be required on a bald crop, and are much more difficult to clean off, besides being very uncomfortable to work amongst.

Again, in the event of it being desired to convert a crop into hay, bearded varieties will not permit of such being done, as the presence of awns is injurious when fed to stock dry, but they can be fed green or in the form of silage.

HOLD GRAIN.

This is a very necessary characteristic nowadays, owing to the methods in vogue, as crops have to stand in the field sometimes long after they are thoroughly ripe before they can be harvested. It is a desirable quality in all situations, but much more so on exposed areas, where the absence of it will result in a great reduction in yield, the percentage being governed by the frequency and violence of the winds experienced.

VARIETY TESTS.

The following are the results of these experiments to date, and the resulting average yields will go further in emphasising the care which should be exercised in selecting a variety for sowing than anything previously mentioned:—

BREAD WHEATS.

Variety.	Seed Obtained from.	YIELD PER ACRE.				Total.	Average.
		1906— Rusty Year.	1907— Dry Year.	1908— Good.	1909— Rusty.		
Bunge No. 1 ...	Local (Queensland)	17·6	11·4	26·7	25·6	84·3	Bushels. 21·07
Crossbred 353	"	9·56	not sown	12·2	25·6	47·3	15·7
Moulds	"	13·4	4·9	16·9	21·0	59·2	14·8
Sussex	New South Wales	8·25	3·2	21·5	24·0	56·9	11·2
Hermitage	Local (Queensland)	13·5	3·1	16·6	22·2	55·4	13·8
J. Brown	New South Wales	14·2	7·6	10·3	23·4	55·5	13·8
Crossbred 349	Local (Queensland)	8·8	5·5	14·3	21·3	49·9	12·4
Bunyip	New South Wales	4·75	8·0	22·5	12·2	47·4	11·8
Plover	"	11·4	6·1	16·3	12·5	46·3	11·5
Rymer	"	8·5	6·3	13·0	16·2	43·0	10·7
Bobs	"	2·5	5·0	21·9	6·6	39·0	9·7
Crossbred 121	"	6·9	8·0	9·2	14·0	38·1	9·5
Schneider	Local (Queensland)	13·4	4·5	10·0	10·0	37·9	9·4
Crossbred 348	New South Wales	10·2	6·6	11·5	6·6	28·3	9·4
Federation	Local (Queensland)	2·75	not sown	26·0	2·4	37·7	9·4
Cross 33	New South Wales	rusted	3·6	12·2	21·4	37·2	9·3
Cross 343	Local (Queensland)	7·4	4·7	8·8	15·8	36·7	9·1
Cross 12	"	14·0	3·8	7·6	10·0	35·4	8·8
Cross 181	"	8·06	3·0	10·7	11·6	33·3	8·3
Budd's Early	"	4·7	not sown	10·5	9·1	24·3	8·1
Cumberland	New South Wales	8·8	5·3	10·7	6·6	31·4	7·8
Manitoba	America	6·0	8·0	15·8	Nil	29·8	7·4
Crossbred 91	Local (Queensland)	6·06	4·0	7·2	10·8	28·0	7·0
Crossbred 50	"	rusted	5·2	10·7	11·6	27·5	6·8
Crossbred 25	"	"	4·0	10·0	11·6	25·6	6·4
Crossbred 55	"	"	5·5	10·5	5·4	21·4	5·3
Tarragon	New South Wales	1·75	1·8	8·4	5·0	16·9	4·2

	DURUM WHEATS.											
	...	...	...	...	Imported, Queensland, 1900	...	23·7	5·7	10·4	16·5	56·3	14·0
Cretan	...	...	...	...	...	...	...	...	...	...	...	...
V. Don	...	...	...	...	America, 1906	...	16·0	1·2	13·0	17·9	48·1	12·0
Kubanka	...	...	...	...	"	...	16·5	3·0	6·1	16·0	41·6	10·4
Morocco	...	...	...	...	"	...	13·8	4·0	9·6	10·4	37·8	9·4
Turkey	...	...	...	...	"	1907	...	2·9	13·6	11·2	27·7	9·2
F. Durum	...	...	...	...	New South Wales, 1906	...	21·7	5·0	10·8	not sown	37·5	9·3
B. Don	...	...	...	...	America, 1906	...	17·6	3·1	5·3	6·6	32·6	8·1
Le Huguenot	...	...	...	...	South America, 1907	...	...	6·7	4·1	8·3	19·1	6·3
Macaroni	...	...	...	...	New South Wales, 1907	...	11·25	1·1	...	not sown	12·3	6·1
Yell. Gharnovka	...	...	...	...	America, 1907	...	...	4·3	5·3	2·9	12·5	4·1
Amantha	...	...	...	...	"	"	...	4·5	11·2	8·3	24·0	8·0

QUANTITY TO SOW.

This is regulated by the quality of the soil and variety.

On strong soils 25 lb. to the acre is sufficient; but on the lighter and poorer soils varieties which do not tiller well require to be sown at the rate of 42 lb. to the acre.

Their seeding results in weedy crops, or liability of the crop to be blown down by storms is increased owing to extra length of straw being produced and less support being afforded to one another by the plants, which is conducive also to shedding on this account.

Sowing too thickly results in overcrowding, which, in a dry season, is disastrous when it results in the survival of the fittest and these latter have been so reduced in vitality in their struggle for existence as to result, even if very congenial conditions are experienced towards the end of the season, in a very poor crop. Again, in a wet one, it facilitates the propagation of rust owing to reduced circulation of air in the crop.

USE OF FERTILISERS.

This subject is one for the chemist, and is of such importance that a paper could be with great advantage devoted wholly to it. For these reasons only a few facts in relation to it will be stated. Practically no fertilisers are used on the wheat lands in Queensland, but the advent of farmers from the Southern States will no doubt result in their more general use on the lighter soils where they would be of benefit—on some even in the first season they are brought under cultivation. So far, sufficient data have not been secured to state what kind of manure would be the most suitable for general use, or what quantity to apply; but experiments last season proved that an application of superphosphate produced an extra yield of 4 bushels to the acre, besides having apparently a beneficial effect on the structural portions of the plant.

In any case before, say, a crop is sown, an analysis of the soil should be obtained to see if it is suitable as it is; if not, then it will be seen what it is deficient in.

THE BEST TIME FOR SOWING.

May, in this district, is undoubtedly the best month for sowing early varieties, though, if mid-season varieties are sown, they can be put in during the last week in April. In some years the May-sown crops, as well as those sown before that month, are inclined to be too forward and in danger of being injured by frost, but this can be checked by mowing, or, better still, by feeding off. It might be stated that many farmers feed off every year by turning their dairy herd into the fields. May-sown crops, which are called "early" by the majority, can withstand adverse weather conditions much better than the later sown, and not so liable to injury by rust. It is surprising what three weeks' difference in the age of a crop may mean. Instances have been noted when a first sowing in May resulted in a beautiful crop yielding over 20 bushels to the acre; whereas a later-sown crop of the same variety, adjacent, yielded practically nothing owing to rust. The same differences have been noticed in dry seasons, notwithstanding that only the same rain fell on to the crops. Of course there are exceptions. Crops sown in August and harvested in November have been known to yield over 20 bushels to the acre, but sowing later than May is to court failure in many forms.

GRADING.

Grading of seed, which is practically selection in a wholesale manner, is to be recommended, as the product represents the seeds of plants most suited to the conditions, the sowing of which results in a more even seeding and stronger constitutioned plants being obtained.

ROLLING.

This is beneficial on very light, sandy soils, as it consolidates the surface, and so facilitates the passage of harvesting implements, and, at the same time, gives the plants a firmer hold of the soil. During a dry spell it is also beneficial, for reasons already stated, on all soils, but on others than those just mentioned it must be immediately followed by the harrows.

The reasons, in addition to those already mentioned, why this paper has been devoted to wheat culture is on account of the fact that this crop will, under circumstances which are fatal to others, yield a return either as grazing for dairy herds, hay, or grain. It is probably the least expensive to engage upon, and does not necessitate the engaging of outside labour. The implements of to-day, for use in dry districts, enable one man to handle his crop at a pinch. It is not dependent on any other branch of farming, but admits of others being successfully entered upon in conjunction with it. And last, but not least, in Queensland, at the present time, we are only producing about one-quarter of the 4,000,000 bushels we require, and we have, so it has been computed, 50,000,000 acres, the greater portion of which is to be found in the drier portion of the State, suitable for the cultivation of this crop.

Before concluding, a few remarks on the other possibilities will be given.

DAIRYING.

Under proper methods it would be very hard to find, in any country of the world, a more suitable and as large an expanse of country so suited for this industry as in or near Western Queensland, and no doubt in time to come wheat-growing will have to give way to this industry in this portion of the State, though at present they go hand in hand, as a wheat crop blasted, owing to some cause, can still prove remunerative if fed to dairy herds.

It has often been stated that this industry cannot be carried out with financial success in districts with a rainfall of under 30 in. Such might have been the case in the past; but now that we have a sufficient regular exportable surplus to enable us to hold a position in the world's market, it is all wrong.

We have droughts certainly, but they are not of frequent occurrence; and what are they compared to the winters of Great Britain, Canada, and other great dairying countries of the world? Nothing. And, if we made a quarter of the provision per head annually that they have to do when adverse seasons were experienced, we would have sufficient and to spare. The conservation of fodder means expense, and a man to enter into the dairying industry requires more capital than the wheat-grower and is more dependent on outside labour, against which there are not so many dangers attending success.

The climate, as before stated, is wholly suited for dairying (and is the reverse of South Australia in many respects, where dairying is carried out successfully). The winters are dry, and the summers are wet. The former does away with the necessity of housing, though it renders it essential that, in order to retain the cream supply, stock must be fed; and the heat and moisture of the latter enable very heavy yields of fodder to be produced for conservation, in the form of maize, besides abundance of feed on the grazing areas.

To this industry and its accompanying branches of Agriculture, a paper could be very well devoted.

FRUIT-GROWING.

The lighter soils of these districts are capable of producing the finest quality of citrus fruits, peaches, apricots, pears, plums, figs, grapes, &c., under good cultivation; and their propagation in conjunction with other

branches proves very remunerative. At present the fruit is marketed fresh, but peach and apricot drying will no doubt be practised when a surplus is produced. Winemaking has assumed fairly large proportions. It is doubtful whether raisin-growing can ever be gone in for solely, for the reason that we lack a chief factor—a dry summer and fortunately so, in other respects.

DRY-FARMING IN AMERICA.

AN ADVERSE OPINION.

There are usually two sides to a question, and on the subject of dry-farming in America it is generally glowing successes that have been recorded; but the special correspondent of the "Australasian" presents in that paper the obverse view, and in scathing language he denounces the speculator who induces the farmer to take up land on that arid plain. The article is exceedingly interesting, if only to prove that dry-farming is not applicable to EVERY case. As the writer says, "farmers can't make moisture," and unless Nature provides a sufficiency, dry-farming must fail. This, however, does not disprove the fact that the principle of conserving the moisture is a sensible one; in fact, the writer concedes that dry-farming is simply good agriculture; and he is quite right; that is all it is, but good agriculture applied to areas of small rainfall will often turn failure into success. There are areas where irrigation must supply the deficiency, and apparently the plains of Wyoming are instances of this fact. The story told by the correspondent is as follows:—

"One morning early in October the recent Victorian delegation to America motored down from Cheyenne, the capital of the State of Wyoming, to Fort Collins, in Northern Colorado. October in America would correspond with April in Australia; the season was well into autumn. The wind was at gale strength in our faces. Goggles (an inspiration of Mr. McKenzie's) protected our eyes from the storm of dust and grit. We were wrapped close in our heavy coats and a pile of rugs, and our hands were tucked into woollen gloves, and still we were painfully cold. Winter begins very early over great areas, of which Wyoming and Colorado are typical. The growing season is brief—not so brief as it is in Canada—but the farmer has to make the most of the warm weather. (It was in northern climates, and not in lands like Australia, that they coined the proverb about the hay and the sunshine.) The season that was closing in Wyoming when we were there had lasted just 100 days; that was the duration between 'killing' frosts, the last of which occurred on 17th May, and the first on 25th August. All growth of crops before 17th May perished on that night, and nothing continued to grow after 25th August. To realise what that would mean in Victoria, imagine a killing frost on 17th November, and another on 25th February—if you can! The growing season, the season of profit, is about twice as long in agricultural Australia as in agricultural America.

"A few miles out from Cheyenne, Mr. Mead shouted something to the chauffeur, and, turning, shouted it to us. To give a look at a large dry-farming district he had decided on a diversion which would add some 30 or 40 miles to our journey. Soon we were among the dry farmers. If there is anywhere on this earth a region which deserves the term 'dry,' it is in South Wyoming and Colorado, as we saw it in October. All about us on an elevation some 6,000 ft. above the level of the sea, reached an undulating plain—a gently-rolling, bare expanse, unbroken by a tree as far as you could see. Clouds of dust swept over it before the gale. A bushy grass, known as 'trouble weed,' and similar to the Australian 'roleypoley,' chased along, and heaped up against the scattered wire fences. Once or twice in a mile we got a sight of the homes of the dry farmers. And such homes! On all the Australian

country-side, from the poorest selectors in the ranges away out to the lonliest huts of the boundary-riders on the hot inland plains, there were no homes so bare and comfortless as those of the dry farmer we saw that day in Wyoming. They stood, most of them a single room, exposed on the cold, wind-swept plain, without a tree or an inch of garden about them—probably the most wretched habitations of any rural people in the English-speaking world. We passed stunted remains of the harvest, if harvest it could be called, for then, at the approach of winter, the scattered dwarfed plants of grain were still in the fields. The season's crops had not reached a state which demanded the practices of the harvester.

"We looked at the crops which had failed, and then at the fallowed areas, in which, according to the theory of dry-farming, the moisture was being caught and husbanded for the next growing season. And on all of this yellow land we saw one of two things: the land was either a mass of dead weeds, which had presumably absorbed all the moisture that had been caught, or where it had been cultivated and the weeds killed and the moisture conserved, it was the seat of a dust-cloud, which was each hour bearing away the precious top soil from every acre. In an occasional paddock a hapless farmer, obedient to the teaching of the dry-farming text-book, went his way with a set of harrows or some other cultivator—a maker of a dust storm on a grand scale. For twenty miles we motored on through this region of delusion and disappointment, watching, with personal thoughts of heavy working days on farms, the hopes and the capital of these unfortunate settlers being blown into space. Once we stopped opposite a miserable hutch close to the road, and waved (shouting in that wind was a waste of breath) to a man in the doorway on the leeward side of his home. We got out of the car and went to his gate, and he came down to meet us. He was a man of about fifty, of the farm-labouring type. We yelled at him about his 'farm' and his practices. He had paid 30 dollars (£6) an acre for his holding of 160 acres—the savings of many years of work on farms of other men further east. That was the price of the land we could see all about us—£5 or £6 an acre. (This we afterwards confirmed.) He was about broke. This season he had not got his seed back. Last season it was a bit better, but at best it was no good. All the men about him were dropping their money just as he was. A sorry story! and the man was obviously sincere.

"We drove on in the dust and the cold. The chauffer got out to kill a belated rattlesnake, and found him sluggish and an easy victim. But we did not think long of the rattler. The plight of those dust-blinded settlers who had been deluded by men with land to sell was alone in our minds. This season dry-farming had failed because the rainfall had failed; and its failure was absolute. The rainfall for the year had not exceeded 8 in., and all the dry-farming practices in the world will not give a crop of wheat on light, sandy soil that gets 8 in. of rainfall, at perhaps the wrong time of the year. And this did not mean the loss of one season only. If there is anything in what the dry-farming enthusiasts tell you, it is essential that every alternate year the land must be in fallow, gathering moisture and strength for the year that is to follow. This land we saw was in the fallow last year, and so gave no return for that season. This year it fails; next year it must go again into fallow, for all the moisture in 100 acres of it in October you could put into your pipe. So it comes to this—a failure means one crop in four years. It was fallow in 1909, it fails in 1910, it will be in fallow in 1911, and gives—perhaps—a crop in 1912. Assuming that those men get a 20-bushel crop of wheat every alternate year, and that no failure was possible, that would mean a 10-bushel average each year on £6 an acre land.

"In estimating the cost of land for dry-farming—that is, land which yields once in two years—you must double the price and nearly double the general cost of working. That holds good of dry-farming all the world over.

Dr. V. T. Cooke, the State Expert in Dry-farming for Wyoming, tries to evade this issue. 'There are quite a number,' he writes, 'who misunderstand when we talk of getting a crop every other year. It is true that we only get a crop off the same land every other year, or, under favourable conditions, say two years out of three, but we must recollect that we get crops by this method when the seasons are drier than usual, and that we get one big crop with one ploughing, one seeding, several cultivations, practically two years' moisture, and one harvesting.' Dr. Cooke continues: 'The ploughing must be deep. The plan recommended in this State is to plough old land 8 or 9 in. deep as early in the spring as possible, so as to save all moisture as it falls.' Everybody knows that to plough land once to a depth of 8 or 9 in. is nearly everywhere as difficult and expensive as two ploughings of 5 or 6 in.; so that it is no exaggeration to say that, to get one indifferent crop on country with a rainfall of 12 in. or 13 in., you have to do almost twice as much work as on land with an acknowledged wheat rainfall that gives you a fair crop for each ploughing.

"As we drove across the dusty tableland we recalled what Mr. John H. Gordon had told us the day before about dry-farming at Cheyenne. Mr. Gordon is the officer in charge of the United States (Federal Government) experiment farm at Cheyenne. He has been forty years in the State, and knows better perhaps than any other man, what can be done in Wyoming with and without irrigation. After many years' experiments, he has little or no sympathy with dry-farming when its object is to reclaim for the farmer lands which have a rainfall below what the centuries have taught us is too low for agriculture—that is, the lands about which, in Western America, the dry-farming enthusiasts, and incidentally the men who are exploiting the movement generally, are the most sanguine about. Among many of the forceful things which Mr. Gordon said to me on the subject, as he showed me over some of the dry farms (including his own experimental plots) were the following: 'Plant life requires a certain amount of moisture.' 'The best of our dry farmers work hard and intelligently but they can't make moisture.' 'The dry farmer in Wyoming is eaten up by expenses.' 'I have seen dry farmers here who at times have not had enough money to buy coffee, and who have burned and ground rice to take its place.' (The American, both of the cities and of the land, drinks coffee as the Australian drinks tea, and he is rarely a tea-drinker. Picture the plight of an Australian farmer who could not afford to buy tea! 'With enough water a crop,' says Mr. Gordon, 'without enough water, no crop. The dry-farmers who are beginning, and the men who are exploiting the movement by buying up land for a few dollars and reselling it at a profit of 500 or 600 per cent., assail me, but I simply record results and make honest reports. The best dry-farming in the world on a 13-in. rainfall won't give a man a living. The dry-farmer out here may not starve to death, but he will only eke out a miserable existence. A crop every alternate year is bad enough, and any failures are ruination. This year we had failure, and it is not the first one.'

Mr. Gordon goes on resentfully piling up the case against the prospects of the dry-farmer. The movement, he says—and this is confirmed on every side—has been exploited in Western America by men who have bought up large areas at 6s. and 10s. an acre, and sold it at from £3 to £6. This movement, which will break more men in pocket and spirit than any other farming movement, perhaps, that the world has ever known, has had a curious history. Dry-farming is probably as old as agriculture. The most ancient tillage of which we know was along the streams of hot countries, and doubtless dry practices preceded irrigation. The Bible tells the man of the soil sometimes to let his plots remain fallow. In short, dry-farming is but another name for good agriculture, and there is nothing in the teaching of the apostles of the new order to-day that the best Victorian wheat-growers did not practice when

we were boys twenty-five years ago. But those who have boomed the movement in America overlook all that. A few enthusiasts, out of the boundaries of what was recognised as the zone of safe cultivation, got good results, either by practices that took no heed of cost and yield or in the occasional season of adequate rainfall. Some were sincere, even though they were mistaken and dangerous men. Others were from the outset interested boosters. Here was the position: The well-watered lands of the Eastern States of America were all taken up, and dear to buy; the great West abounded in lands of light rainfall that could be had for a song. Show that these dry lands could grow wheat, and the world contained no fairer prospect for the speculator. Capitalists pricked their ears at the project, and very soon the 'scientific' dry-farming preacher and the man with money were engaged hand in hand in the fooling and fleecing of the credulous land-seeker."—"Farmers' Union Advocate," N.Z.

POTATO-GROWING COMPETITIONS.

Some years ago prizes were given by the Queensland National Association for the best cottage garden cultivated entirely by the owner. How many gardens were entered, we do not remember; but it was a fair number, and, personally, the editor of this journal carried off the bronze medal (second prize) and certificate. Since then we have heard no more of any such or other competitions for farmers and gardeners, except, of course, at exhibitions. The only competition of late has been one between two shearers last month. Why not revive such competitions as the above—say, for best market garden, best flower garden, most successful potato or corn grower. They would prove a great incentive to the improvement, and probably the permanent improvement, in the quality and quantity of various descriptions of produce. Now that ploughing matches appear to be a thing of the past, owing to the introduction of implements in the use of which the ploughman sits down, presses a button, or pulls a lever, and "we do the rest" say the discs, why not have some competitions which will bring out the latent knowledge of farmers and gardeners? A potato-growing competition appears to us the very thing to stir potato-growers into activity. Years ago Mr. J. Pink, of strawberry fame, produced some marvellous crops of potatoes by gouging out and even halving and quartering the eyes of potatoes; and what has been done, may be done again.

An English exchange contains some interesting details of the recent potato-growing competitions held in connection with the Hallam Fields (Ilkeston) Garden Protection Association. It seems that each year small money prizes are offered to members in two novel competitions. The first one is for members to grow the largest bulk of potatoes from 1 lb. of seed tubers supplied by the association. The conditions are that members can cut the tubers into as many sets as they desire, but this operation, together with the planting, lifting, and weighing, must be done in the presence of the committee. There is also a time limit fixed for the growth of the crop—viz., 1st April to 26th September, both dates inclusive, so that the tubers must not be planted before April arrives, while they have to be dug up by 27th September.

The first-prize winner this year was Mr. W. Booth, who cut his pound of tubers into fifty-six sets, planted them on 3rd May, and dug the crop up on 23rd September, when he had a yield of 221½ lb. The second-prize winner was Mr. F. Barber, who cut his seed into fifty sets, planted them on 4th May, and lifted the crop on 20th September, his produce weighing 198 lb. Mr. A. Savidge was third with sixty-two sets and a yield of 182 lb.; and Mr. S. Warby with forty-six sets and 181 lb., being fourth. One member cut his pound of potatoes into eighty-three sets, yet he only secured 45 lb. of

crop; while two others had eighty-one sets each and lifted as a result 179 lb. and 175½ lb. respectively. The member who had the smallest yield (35 lb.) only planted thirty sets. With the exception of the first-prize winner, all the competitors used farmyard manure alone, though Mr. Booth, in addition, used some chemical preparation.

The average yield for the whole of the competitors works out at 112·4 lb. of crops to 1 lb. of seed tubers supplied—an increase of 12 lb. per member when compared with last year's results. This gives an equivalent of 2·4 lb. weight raised for each of the 2,029 sets planted. When the extreme smallness of some of the cut sets is taken into account, this is a most striking endorsement of the claim that the productive capacity of a potato is not decreased when cut, but rather increased, and also that small sets are equally as good as large ones when conditions of growth are favourable.

In the second competition members were only allowed to cut the pound of seed tubers supplied into thirty sets—neither more nor less—while the other conditions of growth were the same as in the above-mentioned contest. Mr. W. Beecroft was declared the first-prize winner with a yield of 59½ lb. from his thirty sets, which he planted on 2nd May and lifted on 19th September, using farmyard manure alone. Mr. W. Booth, who was first in the other competition, had 55 lb. from his thirty sets, and, therefore, came second, while Mr. A. Savidge again carried off the third prize in this competition, having 48½ lb., the fourth man securing 47½ lb. The smallest bulk raised from thirty sets was 7½ lb. The average weight grown per lb. of seed cut into thirty sets was 27·5 lb., equal to 91 lb. per set of 1,260 sets, planted, which is much below the yield where the pound of tubers were cut into smaller sets, as in the first-mentioned competition. These contests show conclusively that it is not necessary to have big sets for a big yield, and that often a small tuber will produce greater bulk than where the set is twice as large.

THE ANTI-BOOK FARMER.

The following article, which was reprinted lately in the "Queenslander" from the New York "Country Gentleman," is well worthy of the attention of some of our farmers, who pooh-pooh everything written about farming. As the former journal says:—

"Whenever our anti-book farmers can show us better crops at a less expense, better flocks, better farms, and better owners on them than book-farmers can, we shall become converts to their doctrines. But as yet we cannot see how intelligence in a farmer should injure his crops, or what difference it makes whether a farmer gets his ideas from a sheet of paper or from a neighbour's mouth, or from his own experience, if only he gets good, practical, sound ideas."

A farmer (says a writer in the New York "Country Gentleman") never objects to receiving political information from newspapers; he is quite willing to learn the state of the markets from newspapers, and as willing to gain religious notions from reading, and historical knowledge, and all sorts of information, except that which relates to his business! He will go over and hear a neighbour tell how he prepares his garden land, how he selects and puts in his seed, how he deals with his ground in spring, in harvest, and after harvest time; but if that neighbour should write it all down carefully and put it on paper, it's all poison—it's book-farming! If I raise a head of cabbage surpassing all that has been seen hereabout, every good farmer that loves cabbage would send for a little seed and ask as he took it, "How do you

contrive to raise such monstrous heads? You must have some secret about it." But if my way were written down and printed, he would not touch it!

In what States is land the best managed, yields the most, with the least cost? Where are the best sheep, the best cattle, the best hogs, the best fruit, the best wheat? It will be found to be in those States having the most agricultural societies and the most widely-disseminated agricultural papers. What is there in agriculture that requires a man to be ignorant if he will be skilful? Or why may every other class of men learn by reading except the farmer? Mechanics have their journals; commercial men have their papers; religious men theirs; politicians theirs; there are magazines and journals for the arts, for science, for education. I really could never understand why farmers should not wish to have their vocation on a level with others. Those who are prejudiced against book-farming are either good farmers, misinformed of the designs of agricultural papers, or poor farmers who only treat this subject, as they do all others, with blundering ignorance. First, the good farmers: there are in every country many industrious, hard-working men who know that they cannot afford to risk anything upon wild experiments. They have a growing family to support, taxes to pay, lands, perhaps, on which purchase money is due, or they are straining every nerve to make their crops build a barn, that the barn may hold their crops. They suppose an agricultural paper to be stuffed full of wild fancies, expensive experiments, big stories made up by men who know of no farming except parlour-farming. They would doubtless be surprised to learn that 99 per cent. of the contents of agricultural papers are written by hard-working practical farmers, and that the editor's business is not to foist stories upon credulous readers, but to sift stories, to scrutinise accounts, to obtain whatever has been abundantly proved to be fact, and to reject all that is suspected to be mere fanciful guessing. Such papers are designed to prevent imposition; to kill off pretenders by exposing them; to search out from practical men whatever they have found out, and to publish it for the benefit of their brethren; to spread before the labouring classes such sound, well-approved scientific knowledge as shall throw light upon every operation of the farm, the orchard, and the garden. The other class who rail at book-farming ought to be excused, for they do not treat book-farming any worse than they do their own farming; indeed, not half as badly.

A WONDERFUL ROOT SYSTEM.

In its growth lucerne is probably the greatest wonder among plants. While its normal height is about 3 ft., its roots go down 10, 20, or more feet,* and in one case the roots were found penetrating through crevices in the roof of a tunnel 129 ft. below the surface of an alfalfa field. Roots 9 ft. long have been reported from alfalfa, only nine months old; and another report mentions roots of 17 in. long of but four weeks' growth, the plants being but 6 in. high. It usually has a slender tap-root, with many branches tending downward, yet with considerable lateral growth. As the tap-root is piercing the earth it is also sending out new fibrous roots, while the upper ones, decaying, are leaving humus and providing innumerable openings for air, the rains, and fertilising elements from the surface soil. The mechanical effect of this root growth and decay in the soil constitutes one of the greatest virtues of the plant, and by its roots alfalfa becomes, self-actingly, by far the most efficient, deep-reaching subsoiler and renovator known to agriculture.—"The Book of Alfalfa."

* Lucerne roots from 16 to 20 ft. in length are not phenomenal in Queensland; but the palm for length is taken by the case above mentioned, where the roots penetrated to a depth of 129 ft. This occurred in the State of Nevada. For an account of it, see "Queensland Agricultural Journal," December, 1900.—ED. "Q. A. J."

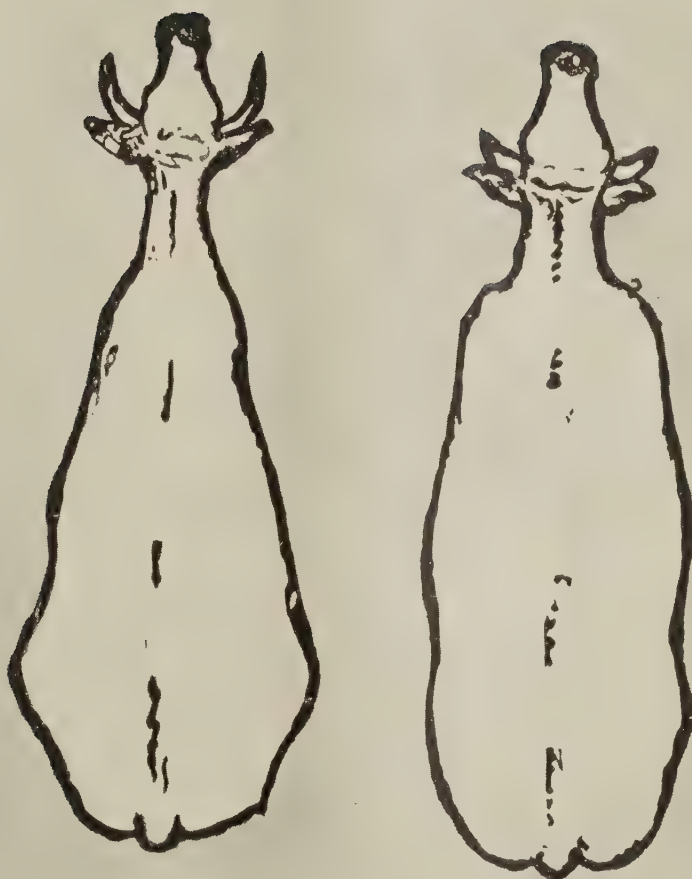
Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

RECORD OF COWS FOR MONTH OF FEBRUARY, 1911.

Cow.	Milk.	Test.	Butter.	At per lb.	Value.
	Lb.		Lb.		£ s. d.
AYRSHIRES.					
Lass	859	4.9	47.48	10d.	1 19 7
Lark	911	3.5	35.35	"	1 9 6
Laura... ..	833	3.4	31.34	"	1 6 1
Auntie	630	4.3	30.38	"	1 5 4
College Lass	594	4.4	30.17	"	1 5 2
Lady Lock	764	3.5	29.64	"	1 4 8
Conceit	691	3.7	28.44	"	1 3 8
Rosalie	753	3.4	28.34	"	1 3 7
Helen	695	3.5	26.97	"	1 2 6
Nine cows	6,730	34.6	288.11	"	12 0 1
Average	748	3.8	32.01	"	1 6 8
SHORTHORNS.					
Glen	619	5.2	38.17	10d.	1 11 10
Patch	737	4.5	37.17	"	1 11 0
Honeycomb	598	5.0	33.77	"	1 8 2
Nellie II.	880	3.4	33.11	"	1 7 7
Gem	818	3.6	32.72	"	1 7 3
Lady Kelso	858	3.4	32.29	"	1 6 11
Grace	791	3.6	31.64	"	1 6 4
Dot	693	3.9	29.12	"	1 4 3
Lady Moreton	683	3.8	28.91	"	1 4 1
Rusty	472	5.3	28.39	"	1 3 8
Butter	637	4.0	28.47	"	1 3 9
Eleven cows	7,816	45.7	353.76	"	14 14 10
Average	711	4.2	32.16	"	1 6 9
HOLSTEINS.					
Miss Melba	651	4.3	31.39	10d.	1 6 2
Daisy	552	4.4	27.26	"	1 2 9
Madame Melba	697	3.5	27.06	"	1 2 6
Dewdrop	802	2.9	25.08	"	1 1 6
Four cows	2,702	15.1	111.51	"	4 12 11
Average	675	3.8	27.88	"	1 3 3
JERSEYS.					
Careless	800	4.6	41.40	10d.	1 14 6
Bee	700	4.2	32.94	"	1 7 6
Cuckoo	514	4.6	26.59	"	1 2 2
Three cows	2,014	13.4	100.93	"	4 4 2
Average	671	4.5	33.64	"	1 8 1

Plate XVI.



TYPES OF DAIRY SHORTHORNS.

GRADES.

Cow.	Breed.	Milk (lb.)	Test.	Butter (lb.)	At per lb.	Value.
Ethel	Holstein-Shorthorn	506	5.4	30.97	10d.	£ s. d. 1 5 10
Lady Sue	" "	640	4.6	33.12	"	1 7 7
Mona	" "	855	4.4	42.23	"	1 15 2
Three Cows	...	2,001	14.4	106.32	"	4 8 7
Average	...	667	4.8	35.44	"	1 9 6
Lemonade	Guernsey-Shorthorn	477	5.0	26.92	10d.	1 2 6
Nancy	" "	676	4.0	32.20	"	1 6 10
Orange	" "	732	3.8	31.00	"	1 5 10
Graceful	" "	982	4.2	46.10	"	1 18 5
Four Cows	...	2,867	17.0	136.22	"	5 13 7
Average	...	717	4.2	34.05	"	1 8 4
Hettie	Ayrshire-Shorthorn	612	4.5	30.95	10d.	1 5 10
Madame Calve	Jersey-Shorthorn ...	500	5.4	31.60	10d.	1 6 4
Lalla	Ayrshire-Holstein ...	648	3.5	35.15	10d.	1 9 3
Comet	Grade-Holstein ...	903	2.8	27.303	10d.	1 2 9
No. 112	Grade-Jersey ...	631	3.9	27.45	10d.	1 2 11
Peewee	Grade-Holstein ...	650	5.0	36.71	10d.	1 10 7

AVERAGE FOR FEBRUARY, 1911, FOR FORTY COWS.

Breed of Cow.	Milk (lb.)	Test.	Butter (lb.)	At per lb.	Value.
Ayrshires (9)	748	3.8	32.01	10d.	£ s. d. 1 6 8
Holsteins (4)	675	3.8	27.88	"	1 3 3
Shorthorns (11)	711	4.2	32.16	"	1 6 9
Jersey (3)	671	4.5	33.64	"	1 8 1
Grades (13)	666	4.1	33.01	"	1 7 6
Average	694	4.1	31.74	"	1 6 5

The record of the milk and butter returns of the Dairy Herd at the Queensland Agricultural College, which is regularly published in this Journal, is rendered more than usually interesting and valuable to dairymen by the publication for the first time of the cash value of the produce of the different breeds of cows. From the average of the month's returns, it will be seen that the Grade cattle top the list, Jerseys coming next, Ayrshires, Shorthorns, and Holsteins following in the same order. It would be very interesting to have a similar return from one or two of the best private dairy farms for the purposes of comparison.

DAIRY SHORTHORN.

Much is being said about the different types of Shorthorn. Our artist has depicted two dairy types, one of which is wedge-shaped. This is the kind the breeder must avoid. Unless a Shorthorn (pedigree) retains its width in front, it will become fleshless and lose constitution.—"Farmer and Stockbreeder."

PIG-BREEDING METHODS CONTRASTED.

The industry as conducted in Denmark has lessons for the average pig-breeder all along the way. The top place in the bacon trade of England has been the goal in view; and the energies of the Government, the pig-breeder, the pig-feeder, the curer, and the seller, all point in the one direction. As one man, all interested in the industry pull together; and every branch separately works for perfection of the whole. The pig-raiser wants only bacon pigs, and these as prolific and good as possible. The feeder, with his eye constantly on the grade his pigs shall ultimately reach, studies to gain this from the least outlay for feed. He does nothing by spells and spasms, but finds the road and persists in following it. Judgment, born of successful experience, keeps his day-to-day practice right, and as a pig-raiser he succeeds. His conditions are not unlike those of the Canadian farmer who follows dairying, except that he has more feed to buy on account of his limited acres. He is succeeding because he will keep only such pigs as are good mothers of vigorous litters; in feeding them only on such foods and in such a manner as he knows gives greatest ultimate profit; in observing the demands of the market upon which the size of his pay cheque depends; and by his confidence in his own efforts and those in charge of the other branches of the industry.

The value of milk and whey in pig-feeding was everywhere exemplified. The Canadian Commissioners who visited Europe recently to compare methods, saw very few pigs being fed without one or the other, and nowhere were these foods fed without a care for the greatest profit.

Roughage, in the form of roots or other green fodder, is considered an essential part of the successful pig-raiser's food supply. These, it is generally believed, help materially to maintain thrift in breeding and growing stock. Nowhere can these be cheaper grown than in Canada, and no pig-raiser can afford to be without them.

Another lesson gathered in each country visited is the importance of carefully grading the ration according to the age of the pigs and the object in view. Everywhere young pigs were fed on easily digested food, rather light in character, and with only a small percentage of green food. As the pigs get older, roughage is increased to cheapen the ration and strengthen and keep in tone the digestive organs. As the finishing approaches, the ration is made stronger, which hastens the fattening and assures a high quality of meat.—“Farmer and Stockbreeder.”

COW-TO-THE-ACRE DAIRYING.

The man who is carrying on diversified farming cannot keep one cow for each acre of land he tills; but the dairyman can, and many do. They do not raise all the grain used, but are content to let their neighbour farmer raise the grain. They know that they can purchase grain for 100 cents on the dollar, and that their good dairy cows will return 2 dollars in product for every dollar of feed. They can better afford to spend their time in caring for the cows than in raising grain. The man with forty good dairy cows on 40 acres of land can furnish all the roughage required the year round. With good land he can do more than this, but we choose to keep on the safe side. He cannot afford to give his cows pasturage, but pasturage is the most expensive feed any way, so we can well eliminate this. We will assume that 5 acres of a good 40 are used for the buildings, roads, and fences. This leaves 35 acres for actual tillage.

Let us consider feed for the winter months first. Allowing on the average 30 lb. of ensilage daily for each cow, the herd will need 1,200 lb. daily, or 120 tons for 200 days; 12 acres of fodder corn will furnish the

ensilage needed, 10 tons per acre being a very conservative estimate. We will allow 4 additional acres of corn for cured-corn fodder, to use as a dry feed at any time that it is necessary to "fill the gap." Some of this may be used in the late autumn before opening the silo.

We have thus allowed 16 acres for corn. In August this land can be seeded down with rye, so that the cows can have some green feed late in the autumn and in the spring before the ground must be prepared for the year's crop.

Then let us devote 5 acres to lucerne if it is possible for us to grow it, and it is possible generally; 50 tons will not be an excessive yield. If the lucerne winter kills, we will still have time in the spring to plant the ground to fodder corn or sow millet. If any of our crops fail, we can sow millet as late as 15th January, and get a crop.—"Australian Field."

DAIRY FARMERS' PROFITS.

Here is a little problem for the believer in foreign methods to work out for himself. If Danish butter commands a little over 1s. per lb. in the English market, what is that worth to the producer in Denmark, allowing about $2\frac{3}{4}$ gallons of milk to make a pound of butter? After taking off all charges for manufacture and the return of the separated milk, the Danish farmer has about $3\frac{3}{4}$ to 4d. per gallon for his milk. How does this compare with what the Queensland dairy farmer makes?—Exchange.

THE NEW AIR TREATMENT FOR MILK FEVER.

The method of injecting filtered air into the udder is easy of manipulation, requires but little time, and is readily accomplished by means of a milk-fever apparatus, which consists of a metal cylinder, sterile absorbent cotton, to which a rubber bellows and another rubber air reservoir are connected by rubber tubing with a milking tube. Within the metal cylinder is a wire net, which prevents the obstruction of the outlet of the chamber by holding back the sterile cotton. Absorbent cotton impregnated with carbolic acid (carbolicised cotton) or other medication can be purchased from the drug trade in most localities, and is better, though slightly more expensive, than the plain cotton.

Previous to making the air injection, the hands of the operator should be thoroughly cleansed and the udder should receive careful antiseptic treatment. Soap and water should be applied to the teats and udder, following which they should be carefully disinfected with a 5 per cent. solution of carbolic acid (3 tablespoonfuls of pure carbolic acid to 1 quart of water). A clean towel should then be placed under the udder to prevent the teats from coming in contact with dirt or filth of any kind. The milking tube, before it is placed in the teat, should have been perfectly sterilised by boiling for fifteen minutes, with the lower hose and milled cap of the cylinder attached, and the apparatus wrapped in a clean towel, without touching the milking tube, to prevent contamination before use. If the apparatus has been subjected to this treatment shortly before, and it is desired to disinfect only the milking tube, the latter may be placed in a 5 per cent. solution of carbolic acid for five minutes. It is then carefully inserted into the milk duct of the teat without emptying the udder of milk. Air is now pumped from the bulb acting as a bellows into the reservoir, and thus a continuous flow of air is forced through the filtering chamber and into the udder. Slight massage or kneading of the udder will cause the innermost recesses of the milk tubules to become distended with injected air. After the quarter is well distended and sufficiently tense, the milking tube is removed, care being taken to prevent the outflow of air by having an assistant tie a broad piece of tape

about the teat at the time the milking tube is withdrawn. The same treatment is repeated in the other three teats until the udder is satisfactorily distended. In case the air becomes absorbed and no improvement is noted within five hours, a repetition of this treatment should be made under the same antiseptic precautions as at first. The tape should be removed from the teats two or three hours after the cow gets on her feet, the constricting muscles at the tip of the teats being now depended on for retaining the air. In this manner air may be left in the udder for twenty-four hours, and, when recovery is assured, it should be gradually milked out. It is needless to say that the calf should not be permitted to suckle during this period.

Inflammation of the udder (caked bag) is avoided if the milking tube is thoroughly disinfected before each application, and if the mammary glands and the hands of the operator have been properly cleansed. If the apparatus is kept in its case free from dust and dirt, the absorbent or medicated cotton in the metal cylinder will efficiently filter enough air to distend the udders of six cows. After this number has been treated, it is advisable to replace the old cotton with a fresh sterile supply, which should be placed loosely into the cylinder.

While this method of treating milk fever is a comparatively easy one for a layman to adopt, he cannot be expected to have the same successful results as those obtained by a skilled veterinarian, and it is therefore advisable that the services of such a veterinarian should always be obtained in those districts where it is possible. In many cases it will be found that the injection of air into the udder will be sufficient to combat the disease without any contemporary treatment; but it is always advisable to study the symptoms of each individual case, and administer in a rational manner the indicated medicines.

PREVENTION.

Up to within recent times the most stringent measures were resorted to by every careful dairyman to prevent the development of the disease in his herd. However, since the treatment of the present day has so greatly reduced and even, in some cases, obliterated the mortality, prevention is no longer such an important problem, and, therefore, preventive measures which have a severe and lasting effect upon the animals should be abandoned from an economic standpoint. It has long been advocated to starve all suspected animals for two weeks prior to the end of their terms of gestation. It is frequently noted that this has an injurious effect upon the milk flow of the animal, from which it may require several weeks for her to recover and gain her normal output of milk. This measure is no longer considered economic, as it is better to have cows attacked with the disease once in a while—the mortality being less than 5 per cent.—than to decrease the flow from every heavy milking cow for from one to three weeks after parturition by starving the animals during the ante-parturient state.

A method which is not quite so sure of reducing the plethoric condition of the cow, but which nevertheless proves very efficient, and is without the slightest permanent injurious effect, is the administration of 1 to 1½ lb. of Epsom salts two or three days prior to calving. In case this has been neglected, and a well-nourished, heavy-milking cow has passed through an easy non-exhausting parturition, the administration of the salts after the labour is over should by no means be neglected. Blood-letting has also been advocated, but there is always the danger of exciting the blood-making organs to excessive activity, and thus reducing the depleting action of the measure to a minimum. It should, therefore, be resorted to only when the cow is extremely fat, is a heavy milker, and has had one or more attacks at previous parturitions.

The blood should be drawn from the jugular vein and continued until the pulse softens perceptibly, or about 1½ pints for every 100 lb. of the animal's body weight.

Another very good preventive measure, and one easily carried out, which is frequently overlooked, is to give the cow plenty of exercise up to the time of calving. Many animals are allowed to run continuously on pastures from the time they go dry until a week or two before calving, when they are transferred to the stable without any subsequent exercise, which is very conducive to the enriching of the blood and the development of the disease.

The most recent preventive treatment suggested is in line with the favourable results obtained by the intra-mammary injection of air. It consists in allowing the susceptible cow to retain in the udder for twenty-four hours following parturition all the milk except the small quantity required by the calf, which should be taken, if possible, from each quarter. The distension of the udder naturally follows, as in the air treatment, and acts as preventive against milk fever. In the Island of Jersey and at the Baltimore farms, N.C., where this practice is common, the number of milk fever cases has greatly lessened. General sanitary conditions should also be looked after, such as the supply of pure air and clean stabling, with plenty of clear, cool water and laxative foods, like grasses and roots.—“American Farmer.”

[Although the above is called “The New Air Treatment,” as a matter of fact it has been known and practiced for some years. Five years ago the operation was successfully carried out at the Queensland Agricultural College. There is no difficulty or danger about it. A cow whilst being operated on remains perfectly quiet, and on getting up seems grateful for the relief afforded. Failing the regular apparatus, a bicycle pump may be used, having a narrow, smoothly rounded nozzle affixed to it, within which the sterilised cotton is placed.—Ed. “Q.A.J.”]

A PHENOMENAL MILKER.

The “Farmers’ Union,” N.Z., says that a Holstein-Friesian cow (Katey Gerben), owned by the Nebraskan Experiment Station, has just completed her fifth year of dairy performance, and the advanced registry office at Delavan, Wisconsin, reported her last lactation as 19,161·2 lb. milk and 665·120 lb. fat. Her record of five years’ performance is as follows:—

Year.	Age.	Milk.	Fat.	Butter.	
1905	...	2	10967·6	338·96	395·45
1906	...	3	18573·4	620·44	723·85
1907	...	4	15985·7	532·60	621·40
1908	...	5	17036·9	559·98	653·31
1909	...	6	19161·2	665·14	776·00
Totals		...	87124·8	2717·04	3170·01
Yearly average		...	16345·0	543·48	634·01

This, the university authorities think, is a new record for a Holstein cow, or for that matter a cow of any breeding, considering age and consecutive yearly performance. Katey Gerben is in splendid condition, and still milking about 35 lb. per day. She will freshen in the winter, and we have every reason to believe she will make a still larger record, being in better condition than ever before.

One month’s production of 1,037 lb. of milk, testing 6·45 per cent. fat and yielding 66·9 lb. of butter fat, was the July record of Rouge 2nd of Brookfield, a two and a-half year old heifer owned by the Iowa Agricultural College. This heifer began her record last 15th January. In the six and a-half months from then until 1st August, she produced £23 19s. worth of butter fat. After deducting the cost of feed, this left a net profit of £13 19s. The total amount of milk produced in this time was 6,778·8 lb., and of butter fat 362·59 lb. Rouge 2nd of Brookfield was imported from Guernsey Island last autumn. The college purchased her from the importer (Mr. W. W. Marsh) soon after she reached this country.

Plate XVII.

IMPORTED JERSEY BULL, WRENTHAM KING.
The Property of Mr. W. T. H. Carr, Indooroopilly.

Plate XVIII.



IMPORTED JERSEY BULL, SOCIABLE'S NOBLE.
The Property of Mr. J. Sinnamon, Moggill.

PEDIGREE OF SOCIABLE'S NOBLE, 4410 P.S., H.C., BORN 17TH AUGUST, 1908.

BRED BY MR. T. LE SIELLEUR, ST. MARTIN, JERSEY ISLAND; OWNED AND IMPORTED BY JOSEPH SINNAMON, ESQ., MOGGILL.

{ Noble of Oaklands, 3909 P.S., H.C. ... 1. Pr. St. Saviour's Show, 1907 3rd ov. Jersey, R. Jas., April, 1908 (with progeny) 1st ov. Jersey, R. Jas., April, 1910 (with progeny)	{ Blue Belle's Blue Fox, 3633 P.S., H.C. } { Shy Fox, 3443 P.S., H.C. ... } Reserve No. R. Jas., April, 1902 { Blue Belle, 4307 P.S., H.C. ... } Parish Pr., R. Jas., May, 1896 3rd ov. Jersey and Parish Pr., R. Jas., Aug., 1896 4th ov. Jersey, R. Jas. and PP., Aug., 1898 { Nobleman, 2555 P.S., H.C. ... } 3rd ov. Jersey and Parish Pr., R. Jas., April, 1898 1st ov. Jersey, R. Jas., Aug., 1898 Reserve No. R. Jas., April, 1900 { Bagatelle 2nd, 6564 P.S., H.C. ... } Lady Viola, 8463 P.S., H.C. ... 3rd ov. Jersey and Parish Pr., R. Jas., May, 1900 Parish Pr., R. Jas., Aug., 1902 Cert. of Merit, May, 1904, 2 lb. 12 oz.—50 days 1st ov. Jersey, for tested cows, R. Jas., Aug., 1904 1st ov. Jersey and Parish Pr., R. Jas., May, 1905 Theatre Challenge Cup, May, 1905 1st ov. England, wherever shown, 1906, 1907, 1908 { Competitor, 2618 P.S., H.C. ... } Sociable 3rd, 9482 P.S., H.C. ...	{ Flying Fox, 2729 P.S., H.C. } 1st ov. Jersey, R. Jas., Aug., 1899 Venus Violet, 3946, P.S., H.C. { Meadow Boy, 1193 P.S.C. } Grisette, 2058 P.S., H.C. { Aristocrat, 2280 P.S., H.C. } 1st ov. Jersey, R. Jas., Aug., 1898 Gipsy Maid, 4424 P.S., H.C. 3rd ov. Jersey, and Parish Pr., R. Jas., May, 1897 { Golden Lad, 1242 P.S., H.C. } 1st ov. Jersey, R. Jas., Aug., 1890 Bagatelle, 5076 P.S., C. { Morion, 1690 P.S., H.C. } Alicante, 3880 P.S., H.C. 1st ov. Jersey and Parish Pr., R. Jas., Aug., 1891 2nd ov. Jersey and Parish Pr., R. Jas., May, 1892 Parish Pr., R. Jas., Aug., 1893 4th ov. Jersey and Parish Pr., R. Jas., Aug., 1896

The Horse.

LAMINITIS IN HORSES.

A London veterinary surgeon, in an article in the "Mark Lane Express," writes on the subject of laminitis, or fever in the feet:—

The causes of laminitis are numerous and varied, ranging from direct local injury to digestive derangement and other constitutional disturbances, which may seem to the casual observer to have no connection whatever with the feet.

The most fertile cause is over-driving on hard roads, especially in hot weather, or when the animal is not accustomed to fast work or long journeys, or, from some reason, generally irregular work, is out of condition. Blows, bruises, pricks, binding of nails, and continued injury from badly-fitting shoes are included among the occasional causes of direct injury.

It may also arise from keeping the animal in a standing position for a long time, since this means keeping the laminae constantly on the stretch, and thus the strain on the feet during a long sea voyage is found to cause it, while it has been known to occur when disease has prevented the horse lying down to rest. Those who are possessed with the idea that a long rest in the stable is the most suitable preparation for prolonged exertion risk laminitis every time they adopt this all too popular method of getting a horse fit for a long road journey.

Included in the group of causes associated with digestive derangement is allowing the animal to drink immoderately of cold water while in a state of perspiration, overloading the stomach with grain, and the injudicious use of purgative medicine. Some of the worst cases have resulted from horses breaking loose during the night, and gorging themselves at the corn bin. Wheat is well understood to be a dangerous grain to feed to horses, as being likely to induce inflammation of the bowels and feet, and readers who have wheat that is unsaleable for milling would do well to devote it to almost any other purpose than feeding to horses.

There is no particular breed of horses entirely exempt from liability to an attack of fever in the feet; but horses with heavy, fat carcasses and large flat feet are greatly predisposed.

SYMPTOMS.

The symptoms of laminitis are very characteristic, but mistakes are often made. In a very large proportion of cases the disease attacks the fore feet, and this is especially the case when the cause is concussion; but all the feet may be affected, only one involved, or the two hind may be the seat of inflammation, and in each instance the symptoms will be very different in certain particulars.

When acute inflammation occurs in the fore feet, the horse generally stands with the hind limbs as far under the body as possible, in order to take as much of the weight on them as he can, so as to relieve the inflamed fore feet, which are also, for same reason, extended forward, so that they rest mainly on the heels. In advancing, the body is balanced on the hind limbs, both feet are lifted at once, and brought down again on the heels. It need hardly be said that any movement is made with great reluctance, and that in a bad case there is the greatest difficulty in getting the animal to stir.

The internal temperature is elevated; there is a full, strong, accelerated pulse, quickened respiration, distension of the nostril, and anxious countenance.

The breathing is often accelerated to such a degree, and fever runs so high, as to lead those to whom a case of acute laminitis is a new experience to suppose that there is something wrong with the lungs.

The affected feet are hot to the touch, and the animal refuses to have them lifted for examination or the removal of the shoes, because of the pain occasioned by being compelled to stand on the other. In some cases the animal, although it generally stands persistently during the earlier stages of attack, lies down on its side and remains in this position for hours, obviously obtaining relief from it. When found lying down and groaning with pain, it is easy to fall into the error of mistaking the case for one of colic or other intestinal disorder; hence it is necessary to get the horse on his feet in order to complete the diagnosis.

In fever in the hind feet the sufferings of the unfortunate animal are even more acute. He stands "all of a heap," the fore feet being carried as far back under the body as possible, while the hind feet are carried forward to meet them. When horses early assume a recumbent position they invariably make a more rapid and thorough recovery, and this posture should be encouraged or enforced. If the animal is made to walk, the advance is in a peculiar halting fashion, a kind of jump forward being made when the toes, to which the inflammation is chiefly limited, receive the weight of the body.

When all four feet are involved, which is happily not often, the symptoms are a combination of those described. There is pain and heat in all the feet, and if they are pressed with the hand or tapped with a hammer the animal winces and groans.

TREATMENT.

The treatment of acute laminitis is best carried out by the veterinary surgeon, but, should there be any difficulty in promptly obtaining the services of a qualified practitioner, it may be pointed out that the treatment depends somewhat on the cause.

If the attack is associated with diarrhoea, or has resulted from the abuse of purgatives, anything that will tend to increase the action of the bowels should be avoided, and such remedies as will allay pain and reduce fever depended on. If, however, the attack is the result of overloaded stomach or improper feeding, such as the use of wheat, the irritating material needs to be got rid of by opening the bowels. Even here violent purgatives must be avoided, for the huge doses of aloes formerly given in these cases were a fertile cause of loss by death. A pint of linseed oil, or a 4 or 5 drachm physic ball, with copious enemata of warm soapy water, or oil and water, may be given in cases where there is constipation. The animal should receive laxative and easily-digested food, such as thin bran mash, greenstuff, or roots in season.

The local treatment is of great importance, and it is mainly here that "doctors differ." One school insists on the necessity for complete rest, while another advocates enforced exercise. Of the last-named system the late Mr. Broad, of Bath, was the principal exponent, and he has still many disciples. The idea of exercise in stout, wide-webbed, long-bar shoes, fitted rocker fashion, is with a view of improving the circulation, but the owner is strongly advised not to resort to exercise in a case of acute laminitis unless under veterinary supervision, for the obvious reason that it might be called cruelty. Treatment, as now practised, rarely includes local bleeding, but some think it beneficial in the early or congestive stage of attack.

Both hot and cold baths and poultices have their advocates. Discussing this difference of opinion, the late Professor Williams ("Principles and Practice of Veterinary Surgery") says:—"For my own part I have found that pain and fever are more speedily relieved by warm fomentations and

poultices in the early stages, and the resolution of the inflammation is promoted by cold applications after the very urgent symptoms have passed off. There is no necessity to discuss the why and wherefore of these two methods; suffice it that warmth has a soothing effect upon a part to which it is applied, and that the soothing of pain in laminitis is the first essential step in the treatment.

In the initial stage of attack, the best plan is to envelop the inflamed feet in large poultices as hot as they can be endured, and to warm them up frequently or renew them. Every encouragement should be given to the patient to lie down, and a large, well-ventilated loose-box thickly bedded with short material that will not become entangled round the limbs should, if possible, be provided. Some advocate casting the horse to remove the weight from the feet.

After the active symptoms have abated, the horse may be stood in a puddle of clay and water, to which a couple of handfuls of salt has been added. The puddle is made by digging a trench in the floor, and securing the horse so that the feet sink into it above the coronets. Standing in a running stream, where such is available, is useful. After the inflammation has subsided, this coronet should be blistered, and a long rest given on the softest pasture in the neighbourhood.

The treatment of the sub-acute and chronic laminitis is a modification of that of the acute disease, and the not uncommon sequel—contracted feet or dropped sole—give a good deal of trouble.

FEEDING HORSES.

There are few animals, terrestrial ones at least, who do not feel a desire for a change of diet occasionally. Especially is this the case with man, who soon gets sick and tired of a constant sameness in food. It is even recorded that some sailors on a mail steamer, who for years had been fed in "wind jammers" on salt beef, pork and beans, and biscuit, get tired of living on turkeys, duck, and fowls, left untouched at the saloon table, and they sent a deputation to the captain, requesting to be fed on decent salt beef and pork. We ourselves once saw what almost amounted to a mutiny on a ship in South America, because the principal part of the fore-castle food consisted of fresh mackerel, which abound on the west coast. It is the same with the lower animals, and particularly with the intelligent horse. He wearies of the eternal chaff and corn or lucerne hay, which is all many city horses get from year end to year end. He wants his food varying. He wants some green food, such as a bundle or two of green lucerne or oats he would, once in a way, like a treat in the way of a nice bran mash. Such a variation in his food will tend to make him more contented, and will keep his bowels regular, and consequently will contribute to his health and stamina. It is a gross cruelty to give horses musty corn or hay, as has lately been done in the North, to the detriment of the animals and to the great loss of their owners.

STALLION LAW IN THE UNITED STATES.

The annual list of the stallions licensed in Wisconsin shows the name of every licensed stallion in the State, whether pure-bred, grade, or mongrel or scrub. A review of the benefits brought about by the stallion law since it was enacted in 1906 shows that there has been a decided improvement in the horse-breeding industry. Since the law became effective, 1,226 grade stallions have been retired from service, and 88 others have been refused licenses or have had their licenses revoked on account of unsoundness.

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

By F. MANSON BAILEY, C.M.G., F.L.S., Colonial Botanist.

ORDER MENISPERMACEÆ.

TRIBE PACHYGONEÆ.

PLEOGYNE, Miers.

Flowers dioecious, axillary, solitary, racemous. Male Flower: Filaments longer than the petals, anthers about 10, pale-coloured, globular; 2-pored. Female Flower: Very slender, sepals 6, $\frac{1}{3}$ line, triangular, acute, very hairy, inner ones much larger than the outer. Petals membranous, exceeding 1 line long, oblong, and marked by 3 longitudinal lines which do not reach to top of petal. Ovaries 6 or 7, gibbose-ovate, compressed laterally, style obliquely attenuate, pilose; gynæceum densely pilose, 1-celled ovule, solitary, angular, drupes 6, seldom maturing more than 1 or 2, reniform-ovate, black.

P. Cunninghami, Miers, in Ann. Nat Hist. ser. 2, VII., 43, T. 136, and Cont. to Bot. Menisperm., 337. A more or less pubescent climbing plant with rather slender terete branches. Leaves oblong or obovate, from $1\frac{1}{2}$ to $3\frac{1}{2}$ in. long, and from $\frac{3}{4}$ to 2 in. broad, mucronate or at times almost emarginate; 3 to 5 nerved at the base; nerves and reticulations prominent; the under side and more or less the upper clothed with bristly tomentum. Petioles straight or tortuous, about $\frac{1}{2}$ in. long; the bristle-like hairs very dense on the petioles and inflorescence. Flowers in axillary racemes. Males about 1 in. long; flowers on pedicels 2 or 3 lines long, very slender; sepals about $\frac{1}{3}$ of a line long, very hairy. Petals slightly exceeding 1 line long, membranous, the lower portion bearing 3 dark lines. Anthers globose, pale-coloured, 10 or more on filaments somewhat longer than the petals. Sepals and petals of the female flowers like in the males. Drupes black, more or less hairy, seldom more than 1 or 2 maturing to a flower, about 3 lines diameter, and not much over one-half of the flowers maturing fruits.

Hab.: Kin Kin, W. D. Francis.

MICROCLISIA, Benth.

Flowers dioecious. Male. Sepals 15, imbricate, and ternately disposed; 12 of them very small, triangular, bract-like; the 3 inner ones 4 to 6 times longer lanceolate-oblong, subacute, æstivation subvalvate; margins involute; apex spreading, reflexed. Petals 6, biseriate, shorter than the long sepals, cuneate unguiculate; the upper broad portion suborbiculate; margins subcrenulate and subinvolute, with 2 fleshy, irregularly dotted glands, subpellucidly punctate, glabrous. Stamens 3, central, free, a little longer than the petals; filaments terete, incurved, erect; anthers subglobose, sub-4-lobed, 2-celled, dorsifixed, introrse, 2-valved dehiscence. Female flowers not to hand. Drupes 3, reniform globose; styles persistent near the base; putamen conformed, 1-celled. Seed exalbuminous; cotyledons thick, subcurvate, radicle mucrete.

M. australis, Benth., Nov. Gen. I., 436; Miers, Cont. to Bot., Menisperm. 339, Tab. 137. A more or less pubescent climbing plant; branches terete, striate subglabrous, the young growth pubescent. Leaves lanceolate-oblong, rotundate or broadly obtuse or acuminate, the apex obtuse and mucronulate, base 3-nerved, then pinnate and arcuate, reticulation prominent and, like the nerves, pubescent and bristly hairy. Petiole slender, pubescent more or less tortuous, mostly under 1 in. long. Panicle (female) axillary, slender, about the length of the leaves; branches bearing few flowers; bracts leaf-like, short; sepals 15, pilose; petals 6, the 3 interior ones opposite the stamens are slightly larger, cuneately-ovate, concave, submembranous, pale, pellucid punctate, with 2 prominent fleshy glands on the side, a little below the middle. The 3 filaments are attached by the slender base to the andræcium, become gradually thicker upwards, incurved at their summit, where they terminate in an oval clavate connective; they are generally clothed with long soft hairs, sometimes becoming glabrous. The anther-cells are oval, widely separated, and laterally embedded in the fleshy connective, bursting by an oblique suture. *Pleogyne australis*, Benth., Fl. Austr. I., 59.

Hab.: Gympie, Dr. F. Hamilton Kenny.

ORDER APOCYNACEÆ.

ALSTONIA, R. Br.

A. constricta, F.v.M.; var. *montmariensis*, Bail., nov. var. (Plate XIX., Fig. 3.) A tall slender shrub, bark tessellately-cracked, yellow inside and very bitter, smooth and more or less velvety and of a reddish-brown on the branchlets. Leaves narrow-lanceolate, opposite, 2 to 3 in. long, 2 to 4 lines broad, tapering at the base to a slender petiole from 3 to 6 lines, thinly pubescent; veins and nerves faintly visible. The corymbose-cymes terminal, small; flowers somewhat scattered, small, the whole inside bearded with white hairs.

Hab.: Mount Maria, Warrego, F.M.B., 1876; Eidsvold, T. L. Bancroft, 1911.

I take this opportunity of giving figures of the three forms of *Alstonia constricta*, F.v.M.

ORDER POLYGONACEÆ.

POLYGONUM, Linn.

P. aviculare, Linn.; var. *erectum*, D.C. Stems tall, erect, or suberect. The leaves are oval and very much broader than those of the normal form.

Hab.: Of late years this variety has been met with in some of our lucerne fields.

ORDER LORANTHACEÆ.

LORANTHUS, Linn.

L. conspicuus, Bail. sp. nov. (Plate XX.) A somewhat stout plant; the branches dichotomous, closely and irregularly ribbed, often between these reddish ribs of a glaucous colour; the nodes rather close and prominent. Leaves coriaceous, nearly or quite sessile; the larger ones $2\frac{1}{2}$ to 3 in. long, $1\frac{1}{2}$ to $1\frac{3}{4}$ in. broad, obliquely ovate, very blunt at the apex, but tapering to the base from about the centre; margins entire, somewhat undulate, 3 to 5 nerved, the nerves slightly branched, the reticulation faint; the smaller leaves more numerous, oblong, or obtuse cuneate, sessile or very shortly petiolate, from 1 in. to $2\frac{1}{4}$ in. long; the margins even, usually 3-nerved. Flowers in axillary

Plate XIX.



1. *ALSTONIA CONSTRICTA*, *F. v. M.* 2. *A. CONSTRICTA*, VAR. *MOLLIS*, *Bail.* : *a*, *b*, *c*, flower in various stages; *d*, top portion of corolla laid open at end. 3. *A. CONSTRICTA*, VAR. *MONTMARIENSIS*, *Bail.*

C.T.W.



C. T. White

LORANTHUS CONSPICUUS, *Bail. n. sp.*—

A, unopened flowers; A^1 , peduncle; A^2 , bract. *B*, open flower. *C*, petal and stamen. *D*, an anther. *E*, pistil. *F*, fruit n.s. *G*, fruit from Broadsound, slightly enlarged.

Plate XXI.



POLYPODIUM IRIOIDES, *Poir.*, VAR. LOBATUM, *Bail.*, FORMA CRISTATUM, *Bail.*

cymes, very dense and dark-coloured, sessile; the bracts and calyx clothed with hairs hoary-white on the calyx, dark on the bracts. Bracts triangular; calyx-lobes minute. Petals free, 6 to 9 lines long, narrow.

Hab.: Eidsvold, Dr. Thos. L. Bancroft.

A specimen, received several years ago from the Herbarium, Royal Botanic Gardens, Kew, and labelled *L. coronatus*, Broadsound, is identical with the present plant; no authority, however, was given for the name *coronatus*, which has since been applied by ENGLER to an African species. The nearest ally of this new species is *L. quandang*, Lindl.

VISCUM, Linn.

V. australe, *Bail., sp. nov.* Growth of plant erect; the main stem very short, sometimes only a few lines; from this arise one or more flat, mostly 3-nerved, coriaceous branches, $1\frac{1}{2}$ to $2\frac{1}{4}$ in. long, 3 to 6 lines broad, bluntly-lanceolate in form, bearing here and there along the margin shorter but similar shaped branchlets. The nodal cluster small, seldom showing any marks or lines to the opposite cluster, and the indentation in which the cluster of flowers is seated is often almost imperceptible, thus in this one can scarcely speak of internodes. Inflorescence much the same as in *V. articulatum*, Burm., Benth. Fl. Austr. III., 396, which Hooker, Fl. of British India, V., 226, says is rather *V. japonicum*, Thunb.

Hab.: Crow's Nest, E. W. Peckey, May, 1886, on a mandarin orange in cultivation; F.M.B., on a native croton, Main Range, near Gowrie, gathered a few small specimens some few years before.

ORDER FILICES.

POLYPODIUM, Linn.

P. irioides, *Pois.: var. lobatum, Bail., forma cristatum n. form.* Bot. Bull. XIII., pl. III.) The present photograph (Plate XXI.) is the representation of the above fern growing in a hanging basket at the Brisbane Botanic Gardens. This wonderful fern was first found near Mackay by Mr. Gilbert Turner in 1895; the plant here figured was lately met with near Gladstone by Mrs. McIntosh.

NOTE.

In my paper in the March number of the "Queensland Agricultural Journal" may be seen a brief notice of the blight fungus *Diplodia pinea*, which does not seem to have been recorded previously for Queensland, and, so far as at present known, now, it is confined to the one tree in Brisbane. Thus it has been thought well to reproduce a few words from a paper in the Kew Bulletin No. 1, 1911—"A Pine Disease," by K. Bancroft. The disease is confined to the terminal portion of the shoots, killing them from 10 to 18 in. down. Spores are produced in abundance; these, however, can only gain admittance into another tree or branch of the same tree by being placed by the wind or otherwise upon a wounded spot or puncture which might have been made by an insect; thus it would seem an easy matter for all our species of *Pinus* found growing in the parks and gardens to become infested with the pest, and, as we hear that the fungus is known to attack other genera of Coniferæ, it might ultimately, if not checked, destroy a large number of our indigenous most valuable timbers. Thus persons having pine trees growing on their land are advised to keep a good lookout for this enemy, and, when they observe the pine dying at the ends of their branchlets, to cut all the dead and dying shoots off and carefully burn them. This mode would probably prove expensive in large trees; with such it might be better to cut down the tree, but all the diseased parts must be burnt to prevent the spreading of the disease; but the nursery stock could be easily handled.

NOXIOUS PLANTS.

THE BLACKBERRY.

Mr. J. H. Henderson, Inspector under the Diseases in Plants Act, has forwarded to the Under Secretary, Department of Agriculture and Stock, photographs of and a valuable report on the spread of the Blackberry Pest in the Stanthorpe district. This plant has already been declared by the Councils of the Town of Warwick and Shires of Clifton, Goolman, and Rosenthal to be a noxious weed. Last February the Home Secretary, the Hon. J. G. Appel, in pursuance of "*The Local Authorities Acts, 1902-1910*," declared the plant known as the Blackberry (*Rubus fruticosus*) to be a noxious weed or plant, and to be a nuisance throughout Queensland. Mr. Henderson, in his report, says:—

"The infestation of the blackberry practically exists throughout the whole of the granite belt, extending from Wallangarra to Dalveen, and covering an area of some 350 square miles. Brambles are to be found in small patches along the banks of all the creeks leading from the Dividing Range to the Severn River, the deep soil deposits forming ideal spots for the propagation of the plants. These streams also act as distributors; the seeds being carried by the water, find resting-places lower down, where they take root. At present these individual patches are of no great area, the largest being only a few perches in extent. On some of the high lands around Paddock Swamp and Sugar Loaf, these patches are very numerous, and show vigorous growth. Over the border, on the New South Wales side, the blackberry is more firmly established than on our side, and, in the event of steps being taken for eradication, the co-operation of the sister State is imperative if the eradication is to be carried out in its entirety."

Mr. Henderson goes on to state that only a few persons in the district seem to grasp the seriousness of the pest, which bids fair to equal the prickly pear in its steady advance, and to be its equal also regarding the difficulties and expenses attaching to its eradication. The Stanthorpe Shire Council have made some efforts to eradicate the brambles from the town area, but along the roads, and in the reserves under the control of that body are to be found innumerable patches without any attempt being made to check or eradicate them. Some property-owners have made attempts at eradication, but, so far, without any great success. Cutting down the brambles and burning them, which is the general method adopted, appears to be useless except in so far as the spread is checked to some extent, as the plants are thus prevented from fruiting, which gives the birds less seed to distribute. But the plants shoot again vigorously from the roots.

Davies' "Peardoom" is now being tried; but, without united action amongst all concerned, it appears that complete eradication is impossible.

PHYLLOXERA IN THE VINEYARD.

Early in the year 1900 it was reported in a Hungarian newspaper that Professor Rozza, of the local Academy of Commerce, had succeeded in discovering a sure remedy for the phylloxera, in acetylene, which, if deposited in the ground in small quantities, produces a gas that will spread over a radius of several metres, and kill within that area all the phylloxera at the roots of the vines, without hurting the stock.

In view of the trouble which has lately been caused by the phylloxera at Enoggera, it might be well to put this to the test. The experiment would, at all events, be a cheap one, and, if successful, might be the means of saving untold future trouble in our vineyards.

Plate XXIV.

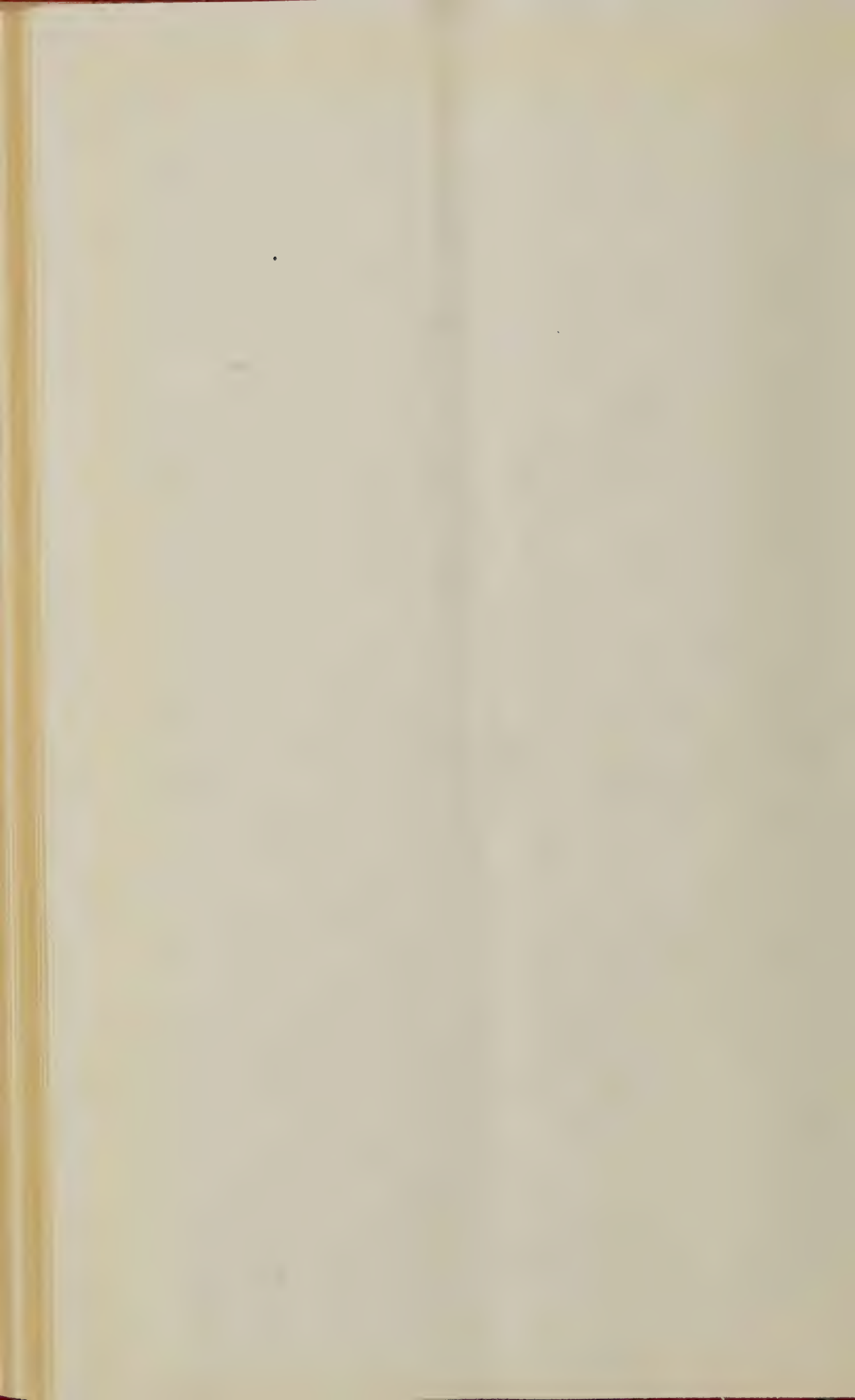


A PATCH OF BLACKBERRIES AT STANTHORPE.

Plate XXII.



BLACKBERRY FRUIT. (Half natural size.)





BLACKBERRIES IN BLOSSOM AND FRUIT AT STANTHORPE.

Poultry.

MARKETING POULTRY.

Very little consideration is given to starving birds before killing. High-class prices cannot be obtained if birds are marketed with a full crop of undigested food. The flesh of such birds is unlikely to be wholesome. While starving, give them plenty of water to drink, within eight or ten hours of killing time. This assists in freeing the intestines of foreign matter.

KILLING OPERATIONS.

Two methods may be properly resorted to—viz., dislocating the neck, or cutting the arteries in the mouth and piercing the brain by sticking through the roof of the mouth.

For a beginner, dislocating the neck is advisable, because it is simple and easily performed. If one is going to kill by piercing the brain (says Mr. W. A. Wilson), I would suggest that they first kill one bird by dislocating its neck and dissect its head for the purpose of ascertaining the exact location of the brain and in what direction it may be reached from the mouth. This is preferable to gaining one's experience by practising on live birds. When dislocating is properly done, there is a space between the neck and the head which is quite noticeable. Into this the blood accumulates, and, in order to insure proper bleeding, the head should be held downward for a few minutes after the neck is broken. Both operations, when properly done, leave the bird unconscious, and death soon follows.

PLUCKING.

Immediately following killing commence plucking. This is claimed by some to be a cruel practice, basing their arguments on the fact that the bird is still alive. That there are signs of life, I admit; but when the killing operation is properly done, all sense of feeling is dispelled.

The so-called evidence of life is but the twitching of the nerves. Piercing the brain or dislocating the neck has the effect of relaxing all the muscles, including those at the roots of the feathers, and dry plucking is easily accomplished.

Furthermore, the appearance of the skin, when the plucking is completed, is much more attractive, providing, of course, that the plucking is carefully done and the skin not torn. The coarse feathers are plucked first, then the rough feathers, and finally the pin feathers. Some dealers ask for a row of feathers around the head, legs, and on the wings; others prefer clean plucking. On this matter be guided by the buyer's wishes.

Scalding for plucking cannot be too strongly condemned. It is difficult and disagreeable; and about all the thanks one gets is a hateful corpse with discoloured flesh, a reduction in price, and abuse from the buyer when you leave his place of business.

SHAPING.

When plucking is completed and before the joints have become set, the birds should be placed in a shaping-trough, made of two 1 in. by 6 in. boards, nailed at right angles. Their legs and wings are closely folded to the body, and they are placed breast down. A weight of 2 lb. or 3 lb. is placed on top. An ordinary building brick is suitable. In this position they are left until thoroughly cooled. The shaping is done to give the birds a plump appearance and make them attractive.

At all times aim to please your customers in "quality" and "appearance," and you will be surprised with the results.—"Agricultural Gazette, London."

Horticulture

PRUNING ROSES.

The following paper on pruning roses was read before the Towers Horticultural Society, at the February meeting, by Mr. H. Beaver, who also gave a practical demonstration of pruning, and recommended the pruning knife instead of the secateurs. He also showed how to prune for show blooms and for a quantity of flowers for garden decoration. The paper brought out a good discussion and some good information valuable to members who grow roses :—

PRUNING FOR BUSHES.

The objects to be attained by pruning roses after removal are to compensate, by reducing the part to be nourished, for the loss of root that has to nourish it, which is always, more or less, suffered by removal. However, much depends on the state of the plant; if the plant be very bushy, with a sharp knife cut away all the weaker branches and leave only a few of the best shoots, and those should be cut to a good outward eye, as this is to be the foundation for you to work on. Then, when the eyes you have left begin to shoot, rub out all that come where they are not required, only leaving those that will be wanted, for it is at this period that you have such control, by driving the whole strength of the tree into the branches that are wanted, for rose trees are often spoilt by leaving too much wood, and so become overcrowded; and I would like to add that when using the knife take the branch in the left hand just below the eye you are cutting to, and with a sharp knife make one clean cut, which will heal over at once, and so add to the effect of the tree, instead of the unsightly mutilation one often sees, which is a disgrace to the owner.

PRUNING STANDARDS.

I shall not deal with this class at any great length, as so few are grown here; but some of the best show blooms have been grown on standards, and when well grown I know of nothing more beautiful; so a few remarks will not be out of place. When you have planted your standards, nothing more need be done until you prune them; then cut all the weak shoots right away, and cut down the strong ones to three or, at most, four, always taking care that you cut to an eye pointing outwards, the object being to make a nice wide head. When the eyes begin to shoot, rub off all weakly growing shoots and all those that grow inwards and cross the head; and wherever two cross each other, remove the weaker one. The others will be strong enough in one season to leave any length you please towards making a proper sized head. The next season you may safely shorten to half their length, taking care that you cut to a bud on the under side, for the tendency of the rose is to grow upwards, and it is only when the growth is outwards that you are able to keep them in a drooping position. When once you have got the head to the proper size, you may cut back every year's wood to two eyes, and always cut out the weak ones altogether. Always remember that you must cut back harder if show blooms are required than you would if quantity of bloom were required.

THE PILLAR ROSE.

The first year they should be cut down nearly to the ground; then when the young shoots appear they must be wound spirally round the pillar, at such distance from each other as will enable them to fill up the space between with foliage. Their leading shoots then form the tree, and the side shoots the flowers, and form a pillar of roses.

ROSES GROWING ON WALLS.

The shoots for this purpose should be nailed or tied, if grown on a trellis, at equal distance to fill up the space required, and when that is done you must keep cutting out all the weak-growing shoots, and never, on any account, be tempted to nail in a forrit shoot, no matter how strong it may be, or your tree will project out from the wall instead of being close, as they will be if only side shoots are nailed in.

In answer to a question if it would not be better to prune to one eye above the one selected so that the sap would not be stopped, he replied, "Yes; if the grower would go over the roses again and prune off the end to the best bud looking outward, but most people would forget, or do not take the trouble."

ARTIFICIAL POLLINATION.

Complaints have been received of marrow and also melon plants failing to set their fruits. The plants grow luxuriantly; they flower freely; but that is all. The most casual observer should notice that the blossoms of these plants, as of all members of the same family, differ in sex—the female flowers having an embryo fruit behind each, while the males have none. The operation of artificial pollination is performed as follows:—Get a small, soft camel-hair brush, and dab it gently on the male flowers until it is full of pollen, then transfer it to the stigma, or central part, of the other; this should be done in the morning of a sunshiny day. Many gardeners are of opinion that plants raised from seeds two or three years old are more prolific than those raised from new seed. Plants, also, which are making rampant growth—the effect of excessive manuring and over-watering—are frequently less prolific than those of a more moderate habit. Thinning out a few of the laterals and stopping back the main shoots also assist in fruit-forming.

In the tomato it is different. Both male and female organs are present in each flower; every one is capable of bearing fruit, but the flowers frequently fail to set their fruit, and this is sometimes remedied by shaking, dabbing, or flicking the expanded blossoms with the hand frequently, when the sun is shining; but flies and bees usually do all that is necessary in this line. Stopping and thinning the shoots the same as for marrows, &c., are also recommended.—"Farmer and Grazier."

POTASH FOR PINEAPPLES.

Potash as a manure has an important bearing on the flavour of pineapples. According to the report of the Cuban National Horticultural Society, experiments on a pineapple field, conducted with the view of ascertaining how much potash would be used with advantage, brought out the fact that surprising differences in regard to sweetness and bouquet occurred with different proportions of potash. The flavour improved up to 8 per cent. potash, from 8 per cent. to 12 per cent. very little difference in flavour could be noticed, but wherever above 12 per cent was used the pineapple was, to use a figurative expression, "sour enough to make a pig squeal." These experiments showed that the presence of potash helped to develop the flavour as well as build up the tissues of the plant, and up to a certain point assisted in the formation of sugar and flavouring matter, until a neutral point was reached, after which acid was strongly developed.—"W. I. Committee Circular."

Viticulture.

HOME MANUFACTURE OF GRAPE JUICE.

At a meeting of the Missouri (U.S.A.) State Board of Agriculture last summer, a very interesting paper was read by G. C. Husmann, Pomologist in Charge of Viticultural Investigations to the United States Department of Agriculture, on "Unfermented Grape Juice." In concluding his remarks, Mr. Husmann gave the following recipe, which will enable anyone having grapes to make unfermented juice out of them, and to keep it fit for use:—

Use only clean, sound, well-ripened but not over-ripe grapes. An ordinary cider mill may be used for crushing and pressing; but, if only a few are to be treated, they may be crushed and pressed with the hands. If a light-coloured juice is desired, put the crushed grapes in a cleanly-washed cloth sack and tie up. Then either hang it up securely and twist or let two persons take hold, one on each end of the sack, and twist until the greater part of the juice is expressed. Then gradually heat the juice in a double boiler or a large stone jar in a pan of hot water, so that the juice does not come in direct contact with the fire to a temperature of 180 deg. Fahr. to 200 deg. Fahr.—never above 200 deg. It is best to use a thermometer; but, if there is none at hand, heat the juice until it steams, but do not allow it to boil. Put it in a glass or enamelled vessel to settle for twenty-four hours; carefully drain the juice from the sediment, and run it through several thicknesses of clean flannel. A conic filter made from woollen cloth or felt may be used. This filter is attached to a hoop or iron, which can be suspended wherever necessary. After this, fill into clean bottles. Do not fill entirely, but leave room for the liquid to expand when again heated. Fit a thin board over the bottom of an ordinary wash-boiler; set the bottles (ordinary glass fruit jars may be used) in it. Fill in with water around the bottles to within about an inch of the tops, and gradually heat it until it is about ready to simmer. Then take the bottles out and cork and seal immediately. It is a good idea to take the further precaution of sealing the corks over with sealing wax or paraffin to prevent mould germs from entering through the corks.

Should it be desired to make a red juice, heat the crushed grapes to a temperature not exceeding 200 deg. Fahr., strain through a clean cloth or drip bag, no pressure being used, and set away to cool and settle, and proceed the same as with the light-coloured juice. Many do not even go to the trouble of letting the juice settle after straining it—simply sealing, heating, and setting the vessels away in a cool place in an upright position, where they will be undisturbed. The juice is then allowed to settle, and when wanted for use the clear juice simply taken off the sediment. Any person familiar with the process of canning fruit can also preserve grape juice, for the principles involved are the same. Care should be taken that the juice is not sterilised at high enough temperature to give it a scorched taste. It should be borne in mind that attempts to sterilise at a temperature above 195 deg. are dangerous so far as the finished product is concerned. Juice should also not be put in bottles so large that much of it becomes spoiled before it is used after the bottles are opened. Unfermented grape juice, properly made and bottled, will keep indefinitely if it is not exposed to the atmosphere or mould germs; but, when a bottle is once opened, it, like canned goods, should be used as soon as possible to keep it from spoiling.

USE OF GRAPE JUICE.

The uses are indeed many. It is used in sickness, convalescence, and good health; as a preventive, restorative, and cure; by the young, by persons in the prime of life, and by those in old age; it is used in churches for sacramental purposes, at soda fountains as a cool and refreshing drink, at home, at hotels, at restaurants, as a food, as a beverage, as a dessert, and in many other ways. When people become accustomed to it, they rarely give it up. When properly prepared, unfermented grape juice can be made to please the eye by its colour and attractive appearance, the sense of smell by its aroma and fragrance, the palate by its pleasing flavour. It is food, drink, refreshment, and nourishment all in one—not a by-product, but made from fruit going to waste: one of the blessings given us that some are too careless, others do not know how, to make use of.

The manufacture of unfermented grape juice as an industry began to assume commercial importance with the beginning of the present century, since which time it has increased very rapidly in importance, so that now between 3,000,000 and 4,000,000 gallons are annually made and consumed in this country, and the industry is steadily increasing.

The use of unfermented grape juice has increased remarkably in most of the European grape countries. It is there listed on menus and wine cards, often as "wine without alcohol," and people are advised to drink it on account of its health-giving and medicinal qualities.

Statistics.

COMMONWEALTH METEOROLOGY.

RAINFALL OF QUEENSLAND.

TABLE SHOWING THE TOTAL RAINFALL FOR EACH MONTH OF THE YEAR IN THE AGRICULTURAL DISTRICTS OF QUEENSLAND.

STATIONS.	1910.												1911.	
	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	
<i>North.</i>														
Bowen	7.10	21.45	5.26	0.18	2.23	0.58	0.18	3.75	0.30	3.89	5.36	23.72	7.57	
Cairns	17.12	24.16	16.13	3.51	6.59	Nil	3.59	1.34	1.67	7.27	11.59	34.49	27.43	
Geraldton (Innisfail) ...	34.57	33.74	24.57	11.90	19.35	1.34	7.42	11.51	3.18	7.30	4.77	36.96	35.51	
Gindie State Farm	...	...	...	...	2.65	1.45	Nil	...	...	...	3.87	11.69	4.15	
Herberton	12.21	12.40	3.50	1.85	1.70	Nil	0.83	0.58	0.43	4.93	9.71	11.43	13.16	
Hughenden	3.59	2.95	0.30	0.41	0.85	0.48	Nil	2.75	1.57	3.41	1.13	9.15	3.76	
Kamerunga State Nurs.	...	...	...	...	Nil	...	3.39	...	2.06	...	...	...	23.08	
Mackay	9.73	24.31	6.18	3.73	5.70	1.1	0.48	4.32	0.7	2.67	2.15	30.52	13.04	
Mossman	...	...	...	...	...	...	1.91	2.90	3.17	10.36	19.91	32.76	...	
Rockhampton	1.28	19.84	0.61	0.59	5.98	1.67	0.23	1.62	0.99	4.17	2.46	9.64	21.07	
Townsville	10.85	17.21	2.29	0.26	1.05	0.33	0.3	3.34	0.11	2.53	6.77	25.40	19.24	
<i>South.</i>														
Biggenden State Farm ...	3.99	3.82	0.73	1.06	5.25	0.92	0.28	...	2.36	4.59	5.93	10.37	7.34	
Brisbane	4.19	6.42	1.22	0.43	6.74	0.39	...	2.72	3.27	2.49	13.99	10.30	5.84	
Bundaberg	2.43	8.92	0.31	0.19	6.17	2.10	0.16	2.33	0.70	8.39	1.58	21.05	9.75	
Crohamhurst	3.39	19.35	3.39	4.44	11.78	0.63	0.70	2.30	3.83	3.31	6.20	28.85	...	
Dalby	1.33	3.87	Nil	Nil	6.06	1.42	0.64	2.11	3.96	4.09	3.29	8.08	2.24	
Esk	1.94	6.09	1.19	0.27	4.74	0.58	0.23	4.65	3.41	3.84	7.53	11.90	6.04	
Gatton Agric. College ...	...	3.66	0.69	0.61	5.05	1.99	0.60	...	3.60	2.85	6.84	12.03	3.98	
Gympie	3.48	7.74	1.13	0.22	5.57	0.83	0.32	1.54	2.90	3.16	1.96	9.13	5.33	
Ipswich	2.78	3.56	1.65	0.20	3.74	1.67	0.58	1.55	3.70	1.96	5.04	8.15	4.19	
Maryborough	2.99	3.92	1.72	0.64	4.89	1.09	0.35	1.22	1.53	4.19	3.19	16.93	6.58	
Roma	1.47	8.36	0.15	0.4	5.71	1.24	Nil	0.45	3.64	4.39	0.96	11.62	5.94	
Roma State Farm	...	...	...	...	...	...	...	0.38	2.95	3.50	7.97	9.72	...	
Tewantin	3.42	15.18	6.30	1.31	15.08	0.76	1.34	1.52	3.17	7.71	8.25	20.84	8.50	
Warren State Farm	...	...	...	...	1.88	...	...	...	0.45	...	...	...	11.75	
Warwick	3.14	2.57	0.68	0.55	3.16	1.82	0.54	1.39	2.20	3.86	3.46	7.13	2.01	
„ Hermitage State Farm ...	...	...	...	...	...	1.73	0.39	...	...	...	...	...	...	
Westbrook State Farm ...	...	...	...	...	2.77	...	...	...	2.98	...	4.44	5.26	3.90	
Yandina	2.07	11.81	3.26	0.40	13.13	0.70	0.15	0.83	3.34	5.16	18.05	12.04	10.73	

NOTE.—The rainfall data in this table are compiled from telegraphic reports, and must be considered as approximate only.

GEORGE G. BOND, Divisional Officer.

Tropical Industries.

A METHOD OF COTTON SELECTION THROUGHOUT THE SEASON.

The "Agricultural News" of Barbados publishes the following interesting extracts from Circular 66 of the Bureau of Plant Industry of the United States Department of Agriculture, which was issued last August under the title of "Cotton Selection on the Farm by the Characters of the Stalks, Leaves, and Bolls":—

The plan of growing in a separate field the cotton that is to be used for seed has several advantages, but one of the most important is often overlooked. It is the education of the farmer himself, so that he can know his variety by its external characters, even in the earlier stages of growth. The result of many experiments in the acclimatisation and breeding of cotton shows that the work of selection can be made much easier and more effective by giving attention to the external characters of the plants in the field, instead of waiting till the crop is ripe and depending on the seed and lint characters alone.

DIVERSITY IN UNSELECTED FIELDS OF COTTON.

In a neglected stock of cotton that has not been receiving any selection at all, the plants are not all equally inferior, but each individual plant is likely to be different from any of its neighbours. The differences between the individual plants of an unselected field correspond to the differences between selected varieties. Each plant of an unselected field might be said to represent a different variety, for it is generally possible by selection to establish a variety on the basis of the peculiarities of any individual plant. Selection is to be thought of as a process of narrowing the lines of descent, and thus securing a greater resemblance among the progeny. A seed produced by self-fertilisation may be said to have only one parent, much as with plants propagated from cuttings.

If the selection proves successful, the result is to establish the expression of the characters of the original selected plant in all of its progeny, so that all the individuals of the stock shall show only the one set of characters instead of the characters of the whole miscellaneous group from which the original plant was selected.

DETERIORATION OF VARIETIES WITHOUT CROSSING.

The general result that is secured through selection is to keep the characters of the inferior ancestors from coming into expression; but selection does not seem to have any power completely to destroy the characters of the inferior ancestors so as to prevent their continued transmission for any number of generations and their subsequent reappearance in individual variations. The work of the breeder is never completely finished or absolutely successful. Though very high degrees of uniformity are attained by careful breeders, such uniformity is not a permanent condition. It has always to be preserved by further selection.

Each new variation constitutes, in effect, a new variety. The subsequent crossing of the different variations with each other and with the parent type produces hybrids just as if the variety had never been pure, or as if it had been mixed with seed of other varieties by intention or by accident.

WHY SELECTION MUST BE MAINTAINED.

Selection, as applied to an improved variety of cotton, is simply a means of keeping undesirable characters out of expression. One of the principal objects to be gained by detailed study of heredity in cotton is to learn the method of selection that keeps the undesirable characters most thoroughly suppressed.

VALUE OF EXTERNAL CHARACTERS IN SELECTING COTTON.

By using external characters in selection, it is possible to secure a large measure of protection against the inheritance and subsequent expression of the characters of degenerate individuals. Studies of degenerate variations of several different types of cotton have shown changes in the external or vegetative characters as well as in those of the fruit and seed. It seldom, if ever, happens that a cotton plant makes a definite change in a single character and continues to resemble the parent variety in all other respects. Plants that are going to produce bolls, or seeds, or lint different from those of the parent variety usually give notice well in advance by changes in the external vegetative characters as well as in those of the fruit and seed.

Some of the most injurious variations are the easiest to throw out early in the season, if attention be given to the external characters. Peculiarities of individual plants that may appear to have no importance in themselves become very significant for purposes of selection.

SELECTION BY CHARACTERS OF STALKS AND LEAVES.

Young plants of a well-selected, uniform variety, growing under the same conditions, follow very closely the same course of development. They have the same kind of leaves; the joints of the stalks are of the same length; and the branches develop at about the same rate and at the same height above the ground. A definite difference in any of these features is warrant for suspecting a plant and giving it closer examination. Another useful mark of distinction may be found in the hairs of the leaves or those of the leaf stems and the branches. A difference in the habit of growth or in the length of the points is very likely to be accompanied by a difference in the amount of hairiness.

The habits of branching have a very direct relation to the earliness of the crop. The main stalk of the cotton plant puts out two different kinds of branches. From the base of the stalk come the vegetative branches, or "wood-limbs," and above these the true fruiting branches that bear the bolls. The vegetative branches do not bear any bolls of their own, but put forth fruiting branches like those of the main stem, though shorter and of later development. Plants that grow too rank and produce too many of the vegetative branches cannot begin to put on their crop as soon as smaller plants that produce fruiting branches closer to the ground. Even for cultural reasons, it would be good policy to pull out any unusually tall, rank-growing plants that do not begin to bear early in the season, if only to give better conditions for neighbouring plants that have begun to set their crop.

(TO BE CONTINUED.)

COST OF SEA ISLAND COTTON PER POUND AND PROFIT PER ACRE.

Some time ago a bulletin was issued by the United States Department of Agriculture dealing with Sea Island cotton exclusively. The following extracts therefrom are interesting to all who grow this valuable variety of cotton:—

"The cost of production may be considered from two points of view:—First, the actual cost to certain producers of whom inquiry has been made;

second, what may be termed the rational cost—that is, the labour, material, and capital necessarily expended in production, directly or indirectly, by the producer himself or by someone else. The first is real, but by no means expresses everything involved. For instance, on unsaleable land, a landlord, with little or no expenditure of capital, may produce a certain amount of cotton with labour given in return for debts that could not otherwise be collected. Such cotton would cost almost nothing to the producer. Between this and the opposite extreme, where the land had been bought above its real value and a large expenditure made in the culture, there is every variation of individual experience—from one of immense profits to one ending directly in bankruptcy.

“The rational cost, on the other hand, is purely theoretical; in estimating the cost of each item of expenditure, it must be generalised and reduced to an average that does not, perhaps, conform exactly to the experience of any individual. It summarises these items, and leaves them recorded for consideration. Both methods are given. Messrs. Hensin and Rivers, on James Island, say 80 dollars (£16) a bale of 400 lb., or 20 cents (10d.) per lb. Dr. A. B. Rose, of Charleston, puts the cost at 70 dollars (£14) per acre which should yield a bale of 350 lb., which gives likewise 20 cents (10d.) per lb. One of the most if not the most successful among Sea Island planters, Mr. J. J. Mikell, of Edisto, says the cost is 15 cents ($7\frac{1}{2}$ d.) per lb. there.

“Before considering the rational cost, a word should be said as to the amount of production. The highest yield on record to 1 acre is 566 lb. of lint, on a single acre, on Mr. Schaffer's place, on Wadmalaw Island. A planter on John Island made an average of 290 lb. of lint per acre, on a tract of 20 acres; while small farmers in the same locality produced only 50 lb. to 75 lb. lint per acre. On Edisto Island there is a tract of 100 acres, producing 210 lb. of lint per acre; and conservative farmers there consider 200 lb. of lint on the larger farms, year in and year out, to be an average yield of fine staple. In Mills' ‘Statistics of South Carolina,’ published in 1825, it is stated that a farmer on Edisto Island produced, on an extensive scale, an average of 270 lb. of clean cotton (*i.e.*, ginned cotton) per acre, from which it would appear that the soil, climate, and old methods of culture had a capacity not very far inferior to that with which the invention of fertilisers and of improved implements and methods at the present day endow this locality.

Then follows an exhaustive table showing the cost of each item of labour and material expended in the culture, per acre, of Sea Island cotton on five different estates. This table includes every possible item, from the cost of the land to storage, insurance, weighing, cartage, and selling of the crop, and shows the following results for each plantation respectively. These were—

1	2	3	4	5
\$45·69 $\frac{1}{2}$	\$51·29 $\frac{1}{2}$	\$48·52	\$52·25	\$27·32

Reduced to British currency, the cost per acre was—£9 2s. 10 $\frac{3}{4}$ d.; £10 5s. 4 $\frac{3}{4}$ d.; £9 14s. 8d.; £10 9s. 4 $\frac{1}{2}$ d.; and £5 9s. 8d.

This table presents the rational cost, giving an itemised account of all expenditures. The first three columns are from Edisto, the yield being placed at 200 lb. of lint per acre. Number 4 is from James Island, the yield being taken at 280 lb. of lint per acre. Number 5 represents the average expenditure of the better class of small farmers on John Island. This doubtless means that these farmers did their own work on their small areas without employing outside labour.

It would be a still more difficult problem to arrive at a satisfactory estimate of the profit per acre to the farmer. This would vary, in the first place, according to the grade of cotton produced, the prices fluctuating with

the fineness of the staple, from 30 cents (15d.) all the way up to 4s. 7d. per lb. The value of the cotton, too, would depend greatly on the handling of the crop, whether it was picked in time, properly stored, screened, dried, ginned, and moted, in all of which operations the skill, care, and forethought of the farmer would count for a great deal.

But, if we place the price of cotton (Sea Island understood) at 20d. per lb., we may offer the following estimates as coming somewhere near the correct deduction to be made from the data furnished by the foregoing figures:—

COST OF SEA ISLAND COTTON PER POUND AND PROFIT PER ACRE.

—	1.	2.	3.	4.	5.
Cost per lb.	11 ⁴ / ₅ d.	12 ³ / ₄ d.	12 ¹ / ₂ d.	9 ³ / ₁₀ d.	13 ¹ / ₂ d.
Cost plus value of seed produced, and less interest on investment	9d.	10d.	9 ¹ / ₂ d.	7 ¹ / ₂ d.	10 ³ / ₄ d.
Profit per cultivated acre ...	£9 0 10	£7 13 4	£8 5 10	£13 19 6	£15 13 6 ¹ / ₂

These figures can, of course, only be approximately correct; but the wide difference that prevails between large farms and high culture and the small farms and insufficient culture is a hopeful indication that the efforts for improvement have met with success—a success that would be much enhanced if we estimate the improved value of the soil itself where high culture has been practised.

A NEW TEAZER COTTON GIN.

From the picking of cotton to the time when it emerges from the loom in the form of woven cloth, there are many mechanical processes which are demanded by the peculiar nature of the fibre. Various inventions (says the "Scientific American"), especially the cotton gin, and, in more modern times, the mechanical cotton-picker, have, more or less, revolutionised the industry; but there are numerous opportunities for inventors to bring improvements to long-established processes. In the ginning of cotton, where the lint or fibre is separated from the seeds, and foreign matter is found in the bolls as picked, the two main processes involve the use of the saw gin, improved from that invented by Eli Whitney, and the roller gin, a machine evolved from a primitive device used for centuries in India. The former (the saw gin) is used for ordinary or Upland cotton, which has a short and thick staple, as the individual fibre is termed. These fibres are separated by a series of rapidly revolving metal disks with saw teeth on their edges, which pass through grids, taking along the cotton fibre, but leaving behind the seeds and dirt. As there is but little space between the saws and the grids, this process is apt to injure the fibre, breaking or cutting it, and thus rendering it less desirable for spinning. The roller gin, which is used for Sea Island cotton, where there is a longer but thinner staple, consists of revolving rollers with rough surfaces, or a single roller and stripper blade, between which the fibre is drawn out, while seeds and dirt are left behind. The roller gin is much slower and is not serviceable with short staple or Upland cotton*, though, with the Sea Island variety, it is used with advantage, as it produces a longer and straighter fibre.

Recently there has been invented an improved teaser cotton gin, which combines the best features of these two fundamental types in practical

form, being able to work on any kind of cotton and producing for the spinner a better grade of lint—that is, without cuts, strains, breaks, or kinks—in which the full length of the fibre is retained. This American teaser cotton gin is the invention of James Brandon, of New York, and has been tested during the past year (1910) in the South and at textile exhibition. It consists of a hopper, into which the cotton as it comes from the field is introduced, containing, as it does, along with the fibre, seeds, leaves, dirt, and other foreign materials. In this hopper are a series of circular gin saws revolving on an axle, but spaced somewhat wider apart than in the ordinary saw gin, and affording a greater clearance space between the saws and the grids, so that the fibre is not broken, but a considerable quantity of seed is carried down with it. In these processes, nails and matches (a prolific source of fire in cotton-mills) and other foreign matter are easily eliminated without damage to the machine or fibre. The fibre, thus loosened, is then taken up by a “teazer,” or series of travelling points of special design, by which it is still further loosened and carried along to a roller. This teaser device consists of a series of teeth operated by gearing, so that they always maintain a vertical position, rising to take the cotton, and then falling; after it is delivered to the ginning roll. By the use of this roll, never before feasible with a short-staple cotton, the “sliver,” thoroughly teased or separated, is passed between a blade and the roller while two strippers moving up and down in opposite directions separate out the seeds and other undesirable material, so that the ginned cotton comes from the machine in its full natural length of fibre without being cut or broken and without kinks.

With long fibre staple, it is claimed that the machine can do twice the amount of work, and, at the same time, turn out a superior grade of cotton to that of the roller gin; while, with Upland cotton, which the ordinary roller gin is unable to handle*, less is ginned, yet the increased length of fibre and the better condition of the lint give increased value to the product. The difference between the cotton ginned by the old processes and by the teaser gin is apparent at a glance. It is loose and fluffy, with longer and straighter fibres—so much so, in fact, as to arouse the interest of many spinners to whom this condition appeals. The seeds and refuse are stripped clean, and do not need to go back for a second ginning to remove any clinging fibre. Numerous other economies are claimed for this new machine which for its operation requires less power than the ordinary roller gin.

THE TAPPING OF HEVEA RUBBER TREES.

Some eighteen months ago a German professor from Strasburg, Professor Fitting, made some interesting studies at Buitenzorg on the tapping of Hevea rubber trees, and an interesting lecture was recently delivered before the Malangsche Agricultural Society by Dr. Th. Wurth on the results obtained, a summary of which appears in the “Cultuurgids.” According to Professor Fitting, every tapping method is more or less injurious to the plant, for by incisions in the bark the transport of the feeding material of the tree is broken. Both the roots and the foliage play a large rôle in the sustenance of the tree. The former takes up water, and at the same time the sal-

* We have no particulars as to the capacity for output of lint or price of this new machine. Concerning what is stated in the above article as to the inability of the roller gin to deal with Uplands cotton, we are in a position to refute the statement. In the sixties, when cotton-growing was in full swing in Queensland, the writer set up two gins at what was then known as Wesley Oxley, near Brisbane. One was a small saw gin, and the other a full-sized Macarthy single-roller gin. No Sea Island cotton was grown in the district—all was Uplands, and, before long, the saw gin was discarded and the whole of the purchased cotton went through the roller gin, which did splendid work. The price obtained for the saw-ginned cotton in London was 10½d. per lb.; that from the roller gin brought from 12½d. to 13d. per lb.—all Uplands.—[EDITOR “Q. A. J.”]

therein dissolved; while the crown of the tree turns the carbon, which is obtained from the carbonic acid gas of the air, into sugar. Out of the salt and the sugar the plant forms building material, which for its life and growth is of the greatest importance. It has been shown that the water with its salt mounts through the wooden part of the stem, while the building material formed in the crown of the tree, which must be transported to all parts of the plant, including the root, descends through the bark. Further, it is in the wooden part of the stem and the bark that the reserve quantities of building material are stored. Whenever the conduct of the sap is broken by any damage to the tree, then the growth of the stem and root is carried on by means of the reserve store until the damage is made good. The professor demonstrates this conclusively by experiments. If a circular incision reaching to the wood is made, the tree, of course, at once endeavours to close this by the formation of tissues, and if it succeeds the sap is carried to the bottom in a normal way and the tree prospers again; if it fails, the root does not receive its proper share of building material, it pines and cannot fulfil its functions, and finally the tree sickens and dies. In the tapping of a rubber tree such serious wounds are, of course, not made; but the same principle brings about similar results, and in the case of an oblique incision—as, for example, by the fishbone method—the transport of the sap is at once interrupted. The plant sets about restoring the sap transport by forming new tissues. For this the reserve stocks deposited in the bark and wood are first used. Professor Fitting showed that in the entire neighbourhood of the wound, in both bark and wood, the sap had vanished. He therefore comes to the conclusion that an incision must not be retapped after the first tapping period until the cells of bark and wood are again filled with reserve material. The professor did not stay long enough to find out how long this takes, but he supposes that more than a year, perhaps even two years, is needed before the new bark can be tapped for the second time. Thus all tapping methods must be condemned whereby too large a portion of the stem surface is tapped at the same time, for thereby too much sap-transport is broken, and there is a risk that the root will not be provided with sufficient building material. For this reason the spiral method, for example, should be abandoned. Professor Fitting advises that a cutting only a quarter of the stem circumference broad shall be first tapped. The tapping of this incision lasts five to six months (first tapping period). Thereafter the tree is allowed to rest for six months. Then begins the second tapping period, and at the opposite side of the stem, again followed by a resting time of six months. The third and fourth tappings follow on the same lines. If it appears in the case of old trees that the latex does not decrease in either quantity or quality, then it is better, instead of making the incisions wider, to shorten the term of rest between the various tapping periods, so that after three or even two years the planter comes back to the incision first tapped.

We see here that Professor Fitting emphasises the necessity for a sufficient surface of untapped incisions.

The professor also utters a warning regarding the suitability of the pricker, for the new bark formed after prick-wounds contains many stone-cells and few milk-sap vessels. Besides this, the wound-tissues swell out, producing an uneven surface, which is a disadvantage in tapping. Professor Fitting thus comes to the following conclusions:—(1.) Tapping methods which largely or wholly break the horizontal moving of the sap-stream from the crown to the base of the tree are to be condemned—viz., the spiral method, the V-shaped incisions without collateral spaces between, the double fishbone method over the whole stem surface, and the two half fishbones—in so far as they extend over the whole circumference. (2.) A sufficient number of untapped not too small (straight) incisions must be allowed to stand until the tapped incisions are again in a state to transport building material (for

this perhaps one to two years are necessary). (3.) Methods with two long cuttings are to be deprecated, as the building material moves only very slowly in an oblique direction. (4.) Of the various tapping methods the herring-bone seems to be the best (with four periods). (5.) The double herring-bone is to be preferred to the single. (6.) Caution must be exercised as to the suitability of the pricker.—“L. and C. Express.”

RUBBER FOR NORTH QUEENSLAND.

We have just received the following extract on the cultivation of rubber which, we understand, appeared some time ago in the “Toowoomba Chronicle.” We quite agree with all that it expresses, and it serves to emphasise what we wrote in the issue of this journal for April, 1910, on the prospects of rubber-growing in Queensland. We are pleased to learn that, despite the adverse criticism on the article by city rubber “talkers” considerable numbers of trees have been planted in the North; and the resources of the Kamerunga State Nursery are, we believe, fully taxed to supply the demand for *Hevea* seeds for local growers. The “Chronicle” says:—“One hears a good deal about winning the rubber, when international cricket, or football, or tennis is in operation; and there is the malodorous ‘red rubber’ scandal concerning the Congo. But, writing generally, rubber is altogether silent in Queensland. The familiar folly haunts this State. Queenslanders always want to grow what they can grow only with difficulty and for no better reason than that it is produced in Greenland or nearly 30,000 ft. up the Himalayas. What Nature intends Queensland to grow, Queensland delights to ignore. One such commodity is rubber. The community prefer to import their rubber from Guiana, *viâ* France, Germany, or Belgium. It is a peculiar, a lamentable idiosyncrasy. Scarcely any other people take pleasure in helping the other nations at its own expense. But such is Queensland.

“Some may consider the practice magnanimous—some others define it by a harsher word. But, at any rate, it is to be hoped that Queensland will shortly rid itself of the malady, be the cause and the character of the cause what it may. The sooner this State, with its immense coastline and tropical territory, regards rubber seriously, the sooner may creditable results be looked for. In the annual report of the Department of Agriculture and Stock for 1908-9 appears this significant statement:—‘India Rubber.—Twenty-five acres are returned as under this crop, but naturally it will be some time before it is sufficiently matured to yield a crop.’ This is at Kamerunga Nursery, near Cairns. Other countries years ago realised the great worth of rubber and acted accordingly. To-day they are collecting a volume of wealth from this source. However, the ancient aphorism reminds a weary world that it is better late than never.

“On further examining the annual report, it is ascertained that ‘a few small plantations have been opened up under rubber, and are doing well. The demand for seed and plants during the season has been greater than it was possible to supply, and an importation of seeds and of plants to meet the demand was obtained from the East.’ This is a little more promising. It is high time that Queensland rose to the occasion and prepared to participate in the benefits accruing from the rapidly increasing request for raw rubber. Later on we should manufacture it as well as produce it. The purposes for which rubber is required are multiplying fast, and it will be urgently needed for many years to come. The Kamerunga plot illustrates that the trees thrive in the Northern part of the State, and plantations should be made to abound at the earliest possible period. Queensland is far too dilatory respecting such opportunities.”

Forestry.

FELLING SCRUB.

It is not everyone who can make a success of scrub-felling. Main strength and hard work are not the only requisites for this work. Getting the trees down is one thing, but to fell them in such a way that a good "burn off" will result is where the real art comes in. New chums at the work usually make a very bad job of it. They fell the trees, allowing them to fall in whatever direction they may incline, and frequently they are dropped on the undergrowth or else they fall back against the still standing scrub, making it difficult and dangerous to clear the timber beneath them. Then, again, it is a common sight to see the felled trees lying across each other, with their branches sticking up in the air. A common practice is to half-cut through a number of trees, and then to bring them down by felling a large tree on top of them. This apparent saving of work really adds considerably to the labour of burning off, because the smaller trees, being only partly cut through, in many cases adhere by splinters and bark to the stump; and hence they continue to draw a certain amount of nourishment from the soil, which prevents their drying, and when the running fire is started they remain untouched, and have to be cut up and stacked for burning. It is the same with the trees lying across each other. Some trees in such a position will cross-burn, but, as a rule, the fire has no effect on them beyond burning the leaves and smaller branches. Another mistake which many people make is to leave the timber too long on the ground before burning. In such a case the leaves which should have helped the burn will have dropped off, and, in addition to this, quick-growing creepers soon begin to run over the timber, and these add to the difficulties of burning off. The general result of this ignorance of the work is that every stick of the timber has to be "handled"—i.e., cut up and stacked, and the half-dried timber is far harder to cut up with the axe than when it is green. The writer, who had large experience of scrub-felling in the early days of the colony (then so-called), treated the first 5 acres he ever felled in the above fashion, and the experience on that occasion was of considerable value to him in after times.

The method subsequently adopted was as follows, and was always successful:—

In dealing with a heavy vine scrub, the first thing to do is to go through it with an axe and scrub hook, cutting down all the undergrowth up to 3 or 4 in. in diameter, and cutting all the vines, especially lawyers and heavy rope-like lianas close to the ground and overhead as high as can be reached. Now there is a clear space everywhere for swinging the axe, without fear of its being caught by a vine in the act of delivering a blow and possibly receiving an ugly wound in consequence. Before starting to cut down a tree, the workman should take a good look aloft, as it often happens that a big broken limb is resting on a branch of the tree to be felled, and it has frequently happened that such a limb has fallen with fatal effect on the head of the careless chopper. Trees whose heads are closely interlaced with vines will often be held after being cut through, and then suddenly swing round and slide off the stump. If there is no clear get-away, the workman in such a case runs a chance of being jammed against another tree, as happened once to the writer. All being clear, the felling of the heavier timber will be no very difficult or dangerous matter. The principal thing to be attended to is to aim at laying all the trees in the same direction, as parallel to each other as possible.

There will naturally be some trees which it is impossible to throw in the proper direction, but an expert axeman can usually swing a leaning tree away from its natural inclination. After felling, the trees should be lopped, all branches sticking up being cut down, and any crossed trunks cut through, the object being to lay the whole mass as flat as possible, and thus causing the timber to lie closer together, giving the subsequent fire plenty of combustible matter to work on without rushing through and leaving a mass of charred trunks and limbs. If the work is well done, and just sufficient time, say six or eight weeks in warm weather, allowed for drying, there will be little left to handle except some of the largest logs.

The felling of very heavy timber flanged at the butt, should only be undertaken by most expert men. This work necessitates the erection of rough staging, often 20 ft. above the ground, on which precarious footholds the men stand at their work. It is the most dangerous system of tree-felling, and I should not advise any new hand to try it before practising on smaller trees and at lesser heights from the ground.

TO EXTERMINATE ANTS.

Many and various remedies have been tried, frequently in vain, to get rid of these troublesome pests. The following means are suggested in a recent number of the "Bulletin" of the Trinidad (W.I.) Botanical Department:—

For the extirpation of ants the following remedies are good. To be effective they require attention and perseverance. It is well to find their main burrow or nest, if possible. Arsenic is sure destruction to them, but it is dangerous to handle:—

Air-slaked lime, plentifully dusted in warm, dry weather over and around the anthills or in the house or other places infested will cause the ants to vacate them in a short time.

Snuff.—Dust a little snuff upon the floor of the rooms of the pantry.

Draw a thick chalk line around a smooth tree or across an upright board or post, and they will not pass over it.

Camphor.—Put a piece of camphor, the size of a filbert nut, into 2 quarts of cold water. When cold, apply to pot and other plants, and the insects will be driven off without injury to the plants.

Mix together 1 part of calomel and 10 parts of finely powdered white sugar; lay it in little heaps about their nests and runs; the ants will eat it and die.

Coal oil, mixed with six times its bulk of water, sprinkled over the nests every few days, will kill and drive them away.

Pans or saucers nearly filled with honey or sweet oil attracts ants, and they are drowned in it.

Flowers of sulphur, $\frac{1}{2}$ -lb.; potash, 4 oz. Set in an earthen vessel over the fire until dissolved and united. Afterwards heat to a powder. Infuse a little of the powder in water, and sprinkle in places infested with ants.

To Destroy Black Ants.—A few leaves of green wormwood scattered among the haunts of black ants will drive them away.

Red Ants.—Powdered borax sprinkled around will exterminate both red and black ants.

Science.

MOSQUITO DESTRUCTION.

Several inquiries have been addressed to us asking for information concerning the means of destroying mosquitoes. These inquiries will best be answered by the following interesting memorandum on the subject lately prepared by the Commissioner for Public Health, Dr. Elkington:—"The destruction of mosquitoes on any considerable scale is a highly technical operation, and requires statutory powers, skilled work, and some outlay to bring it to a successful issue. Given these requirements, however, it is quite practicable. The reduction of mosquito prevalence in a house or small group of houses depends largely upon uniformity of action in the neighbourhood, and the care with which the work is done. The processes resolve themselves into:—(a) Destruction or exclusion of adult insects; (b) destruction of eggs, larvæ, and pupæ in breeding-places; and (c) destruction of and mosquito proofing of breeding-places. Most of the nuisance arises from the purely domestic species, which breed and live in close association with man. These are, in Brisbane, principally the *Stegomyia fasciata* and the *Culex fatigans*. The former, if once infected, conveys yellow fever; the latter filariasis. Other species e.g., the Scotch Grey—appears occasionally in and about houses in Brisbane, but their presence is largely accidental. The domestic mosquitoes breed in small collections of water in the vicinity of houses—tanks, roofs, yard or street gutters, where water lies, seals of traps, dropped sections of drains, tins, boxes, or bottles left lying about and collecting rain water, flower-pot saucers, chickens' drinking places, and pots, and even in water jugs, flower vases, &c., within the house, if these are not regularly emptied and cleaned. The eggs take about eight days, in summer, to develop, through the larvæ and pupæ stages, to the adult insect. The latter lives for some weeks or even months in warm weather; hence the necessity for destroying or driving out adult insects from houses. They are fond of concealing themselves by day in cupboards, wardrobes, curtains, &c.

"The destruction of adult mosquitoes may be attempted by vaporising a mixture made up of equal parts of camphor and crystallised carbolic acid, dissolved by gentle heat. It is best prepared by a chemist. Four ounces of it (for an ordinary room) are placed in an open pan and heated over a small spirit lamp. A white vapour is given off. The doors and windows should be shut, and the vapour left in the room for about three hours. Curtains and hangings should be well shaken afterwards, and any bodies of mosquitoes swept up and burned, as they may be only stunned. A simple and fairly effective way of getting rid of adult mosquitoes in bedrooms is to hang some dark-coloured clothing in a wardrobe or cupboard for mosquitoes to settle on, leaving the door ajar for a night or two, and removing other shelter from the room. An ounce of the camphor and carbolic mixture is then vaporised in the cupboard with the door shut, and the stupefied mosquitoes collected and burned. Mosquito bites may be temporarily prevented by various applications, but their effect passes off after a while. Citronella oil is one such application. Another is made from 1½ oz. of citronella oil, 1 oz. of kerosene, and 2 oz. of cocoanut oil, with about 20 drops of carbolic acid. Others are made from strong smelling scents, such as bergamot.

"The destruction of larvæ is ordinarily effected by the use of kerosene or, better, a mixture of equal parts of kerosene and crude petroleum, on tanks

and collections of water. It requires to be carefully applied and frequently renewed. About a teaspoonful to the square yard should be used to get a good film.

"A draught or breeze will blow the film away, and if even a small breathing hole is left the larvæ will congregate there and survive. Before oiling a tank, care should be taken to remove from it any frogs, or they will die and taint the water. The use of small fish in tanks has given good results. The streams of Southern Queensland contain several species of larvæ-eating fish which are quite as effective as the much advertised 'millions' of Barbados. One fish $1\frac{1}{2}$ in. long, will account for 50 or more larvæ in a day. The 'Green Perchlet,' 'Sun fish,' and 'Firetail' are all useful species. Tanks and roof gutters should be carefully examined. A glance into a tank is not enough, as the larvæ are adepts at hiding when disturbed, and do not come to the surface for some time. When a tank is emptied and cleaned, it is necessary to scrub and wash the inside very thoroughly, as eggs and even larvæ will survive mere drying for some time.

"The destruction of breeding-places is begun by a careful search for small accumulations of water about houses, and their removal wherever possible. Some of the places to look for have been already indicated. Those which cannot be got rid of should be oiled or rendered mosquito proof. Tanks can be mosquito-proofed by various patent devices, or by netting all openings with wire or cheesecloth. If wire-netting is used, it should be of bronze or brass, or it will rapidly oxidise and become useless. It should have at least 18 meshes to the square inch. Cheesecloth painted with iron oxide paint (not lead paint) makes a good screen for tanks, and lasts fairly well. The tank should be carefully cleaned before netting, and any frogs removed. The netting at the inlet and outlet should be mounted in close fitting removable cones or caps, so that it can be easily cleared if it blocks.

"Successful private effort towards mosquito destruction is largely a matter of neighbourly co-operation and intelligent observation. It is well worth attempting, as, in addition to this annoyance caused by mosquitoes, they convey filarial disease, and the *Stegomyia fasciata* will become a terrible menace if yellow fever gains a footing in Queensland, or even in Asia."

FRESHWATER SNAKES.

A correspondent at Mooloolah writes describing what he believes to be a water snake, specimens of which are very much in evidence about the roads and tracks in that district. Unfortunately, he only states that the snake is of a dull, dirty-brown colour, about 2 to 5 ft. in length, very vicious, and is locally supposed to be very venomous. We referred his letter to the Director of the Queensland Museum, Dr. Hamlyn-Harris, who says that, if it is a true water snake it belongs to the genus *Tropidonatus*. When a freshwater snake is cornered or frightened, it instantly shows temper, and, in consequence, this habit on its part has given rise to the popular idea that the snake is venomous; but it is not so, being perfectly harmless. Water snakes frequent the land, especially sunny banks, and dart into the water when hungry or disturbed. The younger examples of freshwater snakes are often brightly coloured, and, as they advance in age, become of a dull-brown colour, develop a flat head, thick body, and they look very ugly. The ugliness of old species of *Tropidonatus* has contributed to the belief that they are poisonous, as it gives them a vicious appearance. The usual size of the freshwater snake is from $2\frac{1}{2}$ to 3 ft., 4 ft. being considered almost an outside measurement. If our correspondent would send us a specimen with head and tail uninjured, it could readily be identified.

Entomology.

THE FRENCH BEAN FLY.

AGROMYZA PHASEOLI, COQUILLET.

WALTER W. FROGGATT, F.L.S., Government Entomologist.

This very serious pest of the French bean was recorded for the first time towards the end of 1898, when several vegetable-growers about Erina and Wamberal forwarded specimens of bean plants having the stems badly infested with small dipterous maggots. The eggs had been laid upon the stems just above the surface of the soil. The resultant maggots, feeding just under the skin, caused the tissue to decay, and so weakened the stems that, if the plants did not die back, the first windstorm snapped them off level with the ground. None of the market gardeners had ever noticed this disease among the beans until the time when it first appeared in the fields in the Gosford district in the spring of 1898.

The damaged bean stalks were placed in the breeding-jars and kept under observation, until swarms of tiny black flies emerged from the pupæ in the stems of the infested plants a few days later. As this small fly was unknown to the writer, a series of specimens were forwarded to Mr. D. W. Coquillet, the leading authority on diptera at the National Museum of Washington, U.S.A., who, upon examination, found that it was a new and undescribed species of leaf-mining fly. Mr. Coquillet kindly furnished a technical description of the pest, which the writer published in the Proceedings of the Linnean Society of New South Wales (1899, p. 129). A note on the first discovery of the fly will be found on page 560 of the "Agricultural Gazette" of New South Wales, Vol. IX., 1898.

In the September number of the "Gazette" in the following year, this fly was figured, and a general description and account of its ravages given. All over this section of the Gosford district there has been a slight infestation of the bean fields ever since. It is usually first noticed in the spring crops, and becomes much worse in the autumn beans ready for harvest in April and May.

THE RANGE OF THE PEST.

This last season (1910) it has not only appeared again as a very serious pest, but it has spread over a very much larger area than in former years; probably partly because a very much larger acreage has come under bean crops in the rich scrub lands so admirably adapted for vegetable-growing.

The pest is apparently a native species, and it is very remarkable how local it is in its range, which, starting about Kincumber, only extends through the Gosford district around Erina and Wamberal. Though recorded from a garden at Wamberal in 1898, there are a great number of gardens within a mile to the north which remained uninfested until last year, but at present they are as badly infested as the original area. Now, however, with the opening up of the brush lands, Inspector Brooks informs the writer that it is spreading northwards, and has gained a footing in the gardens round Wyong.

All the market gardeners in the State should watch their bean crops. When the plants begin to show any kind of rusty discolouration of the stems they should be carefully examined, and, if the bean fly is at work, the

gardener will soon see the destructive maggot moving the damaged skin of the bean stem. The fly may have a very much wider range than we yet know, but which has not been brought under our notice.

From the way it attacks the Wamberal market gardens, it evidently does not travel very rapidly into patches of freshly cultivated land; but once it gets into a bean field it usually appears the following season. In May last we had reports from a number of market gardeners in the Narara and Wamberal districts, stating that the late crops were almost ruined by this pest. I therefore made arrangements with some of the growers, and with Inspector Brooks visited a number of the infested gardens throughout the district.

Everything points to the fact that this is not an introduced pest, but a native of this district, which has abandoned its native food-plant for the more abundant, and probably more succulent, cultivated bean. The only missing link in this fly's life history is its native food-plant. As most insects pests prefer plants belonging to the same order as their natural food-plant, this should be a vetch or leguminous plant, growing wild in the brushes round about the cultivated land; but we have been unable to locate any such plant in sufficient quantities to suggest that it supported this fly before the cultivated bean came into the country.

DESCRIPTION AND LIFE-HISTORY.

The following is Coquillett's technical description of this fly:—

"*Agromyza phaseoli*, n. sp.—Black, including the halteres. Front on the sides opaque, the triangle highly polished, almost reaching the lower end of the front. Body strongly tinged with blue, polished, not light-coloured pruinose on any of its parts; thorax bearing two pairs dorso-central macrochaetae, destitute of acrostichals. Wings hyaline, costa strongly thickened beyond the apex of the first vein, small cross-vein distinctly beyond the middle of the discal cell, hind cross-vein at three-fourths of its length, the small apex of third vein midway between the apices of the second and fourth veins. None of the tibiae nor of the tarsal joints noticeably dilated or swollen. Length, 1.5 mm."

Like the codling moth and fruit flies, it is in the maggot and pupal stages that the bean fly is known to the gardener, and many growers have not even seen the flies close enough to be sure of their identity. This is not to be wondered at, as it is small and inconspicuous in the bean field, measuring only one-twelfth of an inch in length. It is of a uniform black tint, with dull red eyes, the wings semi-transparent with black nervures, the back (dorsal surface) shining, and the whole insect clothed with fine bristles or black hairs. Resting on the leaves in the sunshine, it would appear to the gardener to be a short, broad, tiny black fly, very active, and flying away the moment the leaf is touched or moved.

The eggs have not been observed, but the destructive little semi-transparent, slender, white maggot developed from the eggs is of the usual form of this group of flies, the head end tapering to a point and enclosing a pair of black; retractile, horny, hooked jaws, with which it tears the tissue. It works its way through the tissue while feeding. The anal extremity is the thickest, and truncate or cut off sharply at the tip, ornamented with two little rosettes. The maggot is somewhat of the same general appearance as a small fruit-fly maggot.

When full grown, this maggot forms a pupal covering, and, under the protection of the hard, stiff, chitinous skin, is attached to the bean stem in a crevice of the damaged skin, or is completely covered with it. Exposed to view, it is a dull yellow, elongate, oval little pupa, with both the extremities

dark-brown, and furnished with a pair of short horn-like projections, those upon the narrower head end being short and curved, but the anal ones smaller and more slender.

THE DAMAGE.

The Wamberal market gardeners say that French beans are one of the most profitable crops that they can grow in the rich soil of their district, and estimate their loss during the two months of April and May at several hundred pounds, even at the very low rate of 1s. per bushel; but 2s. or 3s. are often the ruling rates for good beans.

When investigating the first outbreak of this pest, it was noticed that the point of attack was from the surface of the soil to about 2 or 3 in. up the main stem of the bean plant, the eggs being deposited in the cracks or beneath the epidermis in the tissue of the plant. The eggs produced semi-transparent slender maggots, which fed upon and destroyed the surface tissue, and when full grown pupated in or under the rusty, damaged, scurfy skin of the bean plant. This year several growers called my attention to the fact that, besides depositing their eggs in the stem of the bean, when numerous, the flies attack and damage the leaf stalks, puncturing the upper surface of the leaf at its junction with the stalk, and sometimes the maggot tunnels down the leaf stalk. They confirmed the statement that the spring crops are seldom if ever damaged by its presence to any appreciable extent; but, as the warm weather comes, the flies gradually breed up and develop in such swarms as to culminate as a destructive pest in the fall of the year, when climatic conditions are favourable, or their parasitic enemies are not sufficient to keep them in check. The exposed maggot and pupæ, close to the outer surface of the stem, are very easy prey to many hymenopterous parasites.

Though the primary damage to the bean plant is caused by the splitting and corroding in consequence of the presence of the maggots, the plant will often continue to bear beans for a long time afterwards, but the breaking off of the damaged stems thus injured soon reduces the value of the crop.

REMEDIES.

The growers find that in good growing weather they can gain some advantage over the flies by hilling up the soil round the plants, so that the stems are covered, when the bean plant will put out a fresh supply of fibrous roots above the damaged tissue. The hilling up of the bean rows also protects the stems if done before the flies first appear. No spray or wash that has been used seems to have any effect upon the flies; and, as the maggots do not feed upon the surface of the plant but under shelter of the tissue, no poisonous spray upon the foliage would injure them. Tar-water might be found effective to keep the flies from depositing their eggs, but it would have to be sprayed very carefully all over the stems and foliage, as the egg-laying instinct of the gravid female would soon find out any untainted foliage.

As with many other pests, it is a case for clean cultivation. The maggots pupate in the bean stems, from which, if the plants are allowed to remain in the field, the flies will emerge in due course. It would be advisable to pull and burn all infested bean plants as soon as the last lot of beans have been gathered; otherwise, if the plants remain dead and dry, many pupæ may drop out of the cavities in the stems, and, falling on the earth, remain in the ground long after the dry stalks have been removed. Several growers informed me that, although they had cleaned up and burnt all the old beans the previous season, they found the following year, when they planted beans in the same land, that they had not got rid of the flies. Probably some pupæ had dropped from the damaged bean plants before they were removed.—“*Agricultural Gazette of New South Wales.*”

General Notes.

THE DERIVATION OF THE WORD "SILO."

A correspondent asks us,—“What is the meaning of Silo?” The silo itself means a very great deal to the dairy farmer, since by its help he can tide his stock over several months of scarcity of feed. But it seems that J.S., our correspondent, wants to know the meaning of the word—the derivation of it. Here it is. The word silo came from the Greek *σιπος*, *siros*—a pit or hole sunk in the ground for keeping corn in. Then *siros* became Latinised into *sirus*, and in its turn *sirus* in Spanish and French was corrupted into *silos*, or, as is found in old books in those languages, *silo*; and in Spanish there is the verb *ensilar*, which signifies the putting of corn into a silo, and the French writers gave the term “ensilage” to the material thus stored away. The father of modern ensilage, M. Goffart, was practically the first to use it. As to silos and ensilage being modern inventions, it is, on the contrary, as old as the Pharaohs, and possibly Noah fed his stock in the Ark on compressed ensilage. The old naturalist Pliny mentions it as being known in Thrace and Cappadocia. The Roman generals in Africa and Spain (he says) dug holes in dry ground, spread chaff or stubble underneath, and laid up grain in the ear in them. Most of the Greek authors—Euripides, Theophrastus, Hesychius, and Suidas—speak of the *siros* or silo.

Amongst the Eastern nations ensilage has been largely used. In Barbary often 200 or 300 silos have been found together, the smallest holding 400 bushels. In Egypt a similar method has been in vogue for ages. Colonel Burnaby, in his “Ride to Khiva,” and Mr. O'Donovan, in “The Merv Oasis,” both refer to the subject. The colonel tells how he met a party of men and women near Khiva who were engaged in unearthing a quantity of grass from a deep cutting in the ground. This grass had been mown the previous autumn, and was thus preserved until such time as the owner required it—the grass was as fresh as the day it was cut. It is remarkable that the kafir word for a grain pit is *essisile*, which seems to have affinity with silo. The South Sea Islanders have long practised the ensilage of breadfruit, taro, yams, &c. The Mexicans knew all about silos centuries ago. But we could write a whole book on the subject. This will probably suffice; but will it suffice to induce some of our farmers to rise to the wisdom of our savage ancestors and build silos?

PARASITIC NODULES IN AUSTRALIAN BEEF.

A Local Government Board report, issued last January, discusses the question of the parasitic worms occurring in Australian meat. Dr. Leiper's conclusions are as follows:—

- (1) The parasitic nodules in Australian beef are, without exception, due to the presence of long, thread-like worms of the genus *Onchocerca*.
- (2) The diseased condition, *Onchocerciasis*, is not peculiar to Australian cattle, but occurs also in other animals, and in various parts of the world, including the United States of America.
- (3) The parasites belong to a group of worms that require to be taken up by a biting insect, and to undergo a certain degree of development therein before they can be transmitted to another warm-blooded animal.

Plate XXV.



USEFUL HOES.

- (4) The worms and their young do not appear to be capable of surviving for more than a few hours the death of the cattle. No evidence of vitality of the worm or its embryo has been met with in the case of Australian beef reaching this country.
- (5) From (3) and (4) above it follows that the direct development of the parasite in man as a result of eating the affected meat is impossible.
- (6) The nodules are the product of changes taking place in the tissues as a result of some acrid toxin excreted by the worms. In my opinion, their presence in meat intended for human consumption is undesirable for this reason.

There can be no question, says the report, that meat affected must be classed as "unsound." Both the worms and the local inflammatory products which result from their invasion are foreign to sound meat, and are objectionable to the meat consumer. Steps are now being taken in Australia to provide for removal of portions of quarters affected by parasitic nodules before exportation. Although this form of parasite has hitherto attracted attention almost solely in Australian beef, Dr. Leiper considers that it has an area of distribution wider than Australia—a consideration which may be usefully borne in mind in the examination of beef imported from other countries.—"Farmer and Stockbreeder."

USEFUL GARDEN HOES.

Mr. R. Weldon, of Gympie, has devised the simple garden-hoe here illustrated. The advantage claimed for it over the ordinary Dutch hoe is that it throws the weeds off to the right and left of the implement, whereas in the Dutch hoe the weeds clog the open portion by piling over it as the tool is pushed forward. These hoes are very light, and are made in different sizes; the smaller ones being adapted for ladies or even for children's use. The blades are of hardened steel, and will stand long wear. Messrs. Smellie and Co., Brisbane, are, we believe, agents for the sale of these hoes.

EFFECTS OF TRANSPORTATION ON LIVE STOCK.

As showing the effect of transportation to a new country, it is worth while (says the "Live Stock Journal") chronicling the fact that some Shropshire Down wethers bred from imported stock, and which were slaughtered in New Zealand recently, turned the scales at 210 lb. when clean. This surely is a record for this class of sheep. A further instance of animal development is evidenced by the weight of a hide taken from an ox at Levin, New Zealand; this weighed 121 lb., and was sold at 7d. per lb., realising £3 2s. Probably these abnormal weights are the result of richer feeding, as it is well known that deer, hares, pheasants, and trout all grow larger in New Zealand than in their native habitat.

LARGE v. SMALL FARMS.

Over fifty years ago, Abraham Lincoln said:—"The ambition for broad acres leads to poor farming, even with men of energy. I scarcely ever knew a mammoth farm to sustain itself, much less to return a profit upon the outlay. I have more than once known a man to spend a respectable fortune upon one, fail, and leave it, and then some man of modest aim get a small fraction of the ground, and make a good living upon it. Mammoth farms are like tools or weapons which are too heavy to be handled; ere long they are thrown aside at a great loss."

PIGS IN THE UNITED STATES.

According to a table of statistics, there are 59,131,000 swine in North America. Ninety-five per cent. of all the swine in North America are in the United States, which means that there is a sufficient number in the union for every man, woman, and child to have a little more than seven-tenths of a pig. Still, the country has just suffered from an acute shortage of hogs—in fact, the entire world has suffered for the want of a sufficient supply of porkers, and there is an urgent cry being heard for a material expansion of the hog-raising industry. The reason for this is that the hog is the principal animal in supplying the demand for meat. Nearly half ($48\frac{1}{2}$ per cent. to be exact) of the net edible meat used by Americans is pork, and the demand for this meat is steadily and rapidly broadening both here and abroad. Add Science.

FLIES IN THE DAIRY.

An English paper reports that "it has been found that flies have a great objection to the colour blue, and, if tenements infested with flies are washed with a blue instead of a white wash, flies will desert the place. In support of this, an instance is reported by that journal:—A farmer had 170 cows housed in different sheds; they were pestered with flies, but he observed that in one shed, the walls of which were a blue tint, the cows were not worried. He therefore added a blue colour to the lime with which he washed the walls of his buildings, and from that time the flies have deserted his buildings. The following formula is used by him for the wash:—To 20 gallons of water add 10 lb. of slaked lime and 1 lb. of ultramarine. The washing is done twice during the summer." Any remedy, especially such a simple one, is well worth trying in districts where the flies in summer, in this State, are such a serious pest.

PAPER FROM THE PRICKLY PEAR FIBRE.

The "Bulletin" of the Department of Agriculture of the Bahamas states that experiments at the Imperial Institute have shown that a pulp can be prepared by the process of heating the fibre of the prickly pear with caustic alkali under pressure, but that the product so obtained consists of very short fibres, about $\cdot 125\text{--}\cdot 33$ in. long, and would, therefore, be of comparatively low value. It is probable that the collection of the raw material would be a costly operation. Moreover, a little consideration will show that an immense quantity of the plant would have to be dealt with in order to produce a comparatively small amount of paper pulp. Experiments at the Imperial Institute have proved that 100 parts of dry prickly pear fibre yield about 42 parts of dry paper pulp.

MAIZE FOR THE SILO.

Maize that only reaches the tasselling stage by the time it is necessary to fill the silo only contains 186 lb. of digestible nutrients per ton, if it reaches the silking stage it will contain 211 lb., when in the early milk it will contain 257 lb., in the late milk 286 lb., and at the glazing stage 339 lb. So that it will pay farmers to grow a maize for ensilage purposes that will reach the glazing stage by the time it is necessary to fill the silo.

LIQUID MANURE FOR ROSES.

When giving liquid manure to shrubs and rose trees, do not pour it too near the stem, for the roots that drink it up are further away; and always give a good soaking to allow it to reach the whole of the root area. The hoe should be used round the plant a short time afterwards.

Answers to Correspondents.

WHITE ANTS AND GRAPE VINES.

T.P.K., Loganholme—

There are two ways in which the ants may be got rid of. One is by arsenical poisoning; the other by the use of bisulphate of carbon. For the first plan, get 3d. worth of arsenic, and pound it as fine as flour. Next collect as many white ants as possible; mix the ants with the arsenic, some molasses, and a little soil. Make this into a ball, and place it near the ants' nest. The living ants will devour the dead ones, and their followers will devour them. There will be an end to them. For the second plan, make two or three holes with a crowbar, about a couple of feet away from the vine. Pour into each an ounce of bisulphate of carbon, and plug up the holes. The fumes will permeate the soil and destroy every living ant. As the chemical is highly explosive, be careful not to strike matches or smoke during the operation.

MANGE ON HORSES.

J. WOODSIDE, Juandah—

The affected parts should be well washed with warm water and soda, and allowed to dry. Then apply the following dressing once daily for three days:—

Sulphur, 4 oz.; creolin, $\frac{1}{2}$ oz.; linseed oil, 1 pint.

The above can be repeated after a week.

MANIPULATING COWS' UDDERS—COOPER'S REEDS.

"DAIRYMAN," N.C. Line—

Question 1.—What is the method of manipulating cows' udders employed by the Danish milkmaids, and called "The Helgebund Method"?

Answer:—Firstly, the cow's udder must be thoroughly cleaned. Any closely adhering dirt is removed by washing. After the udder dries, it should be brushed over with a very soft brush to remove all remaining coarse grit. The udder is then in a fit state for the application of the process which, in reality, is nothing more or less than gentle massage of the udder. The purpose of the massage is to encourage the udder circulatory system and milk glands to greater activity; therefore the massage should be particularly confined to the regions of the milk veins and milk glands. The movements of the operator's hands should agree with the course of the principal veins—not across them. Each quarter of the udder is treated separately, taking the forequarters first. To be effective, at least two minutes' treatment must be given to each quarter. The work is, of course, done just prior to milking. The hands of the operator should be thoroughly clean. No oil or other lubricant is used.

2. We have not heard of any means by which rushes growing in water, such as the "Cooper's Reeds" you mention, can be destroyed. It has been stated that a small fish which occurs in some bore streams destroys the rushes which spring up so quickly after a bore has been started, by nibbling at the roots; but we have no authentic record of this.

The Markets.

PRICES OF FRUIT—TURBOT-STREET MARKETS.

Article.	FEBRUARY.	
	Prices.	
Apples (Local), per case	3s. 6d. to 6s. 9d.	
Apples (Cooking), per case	4s. 6d. to 6s. 6d.	
Apricots, per case	3s. 9d. to 5s.	
Bananas (Cavendish), per dozen	2d. to 2½d.	
Bananas (Sugar), per dozen	1½d. to 2d.	
Cherries, per quarter-case	...	
Grapes, per lb.	...	
Lemons (Italian), per case	12s. to 12s. 6d.	
Lemons (Local), per case	7s. to 9s.	
Mangoes, per case	...	
Nectarines, per case	...	
Papaw Apples, per quarter-case	2s. to 3s. 6d.	
Passion Fruit, per case	2s. to 3s.	
Peaches, per case	4s. 3d. to 5s.	
Pears, per case	6s. to 7s.	
Persimmons, per quarter-case	1s. to 2s.	
Plums, per case	4s. to 5s.	
Pineapples (Ripley), per dozen	1s. 3d. to 1s. 10d.	
Pineapples (Rough), per dozen	9d. to 1s. 9d.	
Pineapples (Smooth), per dozen	1s. to 2s.	
Quinces, per case	3s. to 6s.	
Tomatoes, per quarter-case	1s. to 1s. 4d.	
Watermelons, per dozen	...	

SOUTHERN FRUIT MARKET.

Apples (Local), choice, per case	6s. to 9s. 6d.
Apples (Cooking), choice, per case	3s. 6d. to 4s. 6d.
Apricots, per gin case	3s. 6d. to 5s. 6d.
Bananas (Queensland), per bunch	1s. 8d. to 2s. 6d.
Bananas (Queensland), per case	8s. to 9s.
Bananas (N. Queensland), per bunch	1s. 8d. to 2s. 6d.
Bananas (Fiji), G.M., per bunch	4s. to 8s.
Bananas, (Fiji), G.M., per case	14s. 6d. to 15s. 6d.
Cherries, per quarter-case	...
Cocoanuts, per dozen	2s. to 2s. 6d.
Gooseberries, per half-bushel case	...
Grapes (N.S.W.), per half-case	4s. to 7s.
Lemons (N.S.W.), per gin case	3s. to 5s.
Mandarins, per gin case	5s. to 10s.
Mandarins (Queensland), Emperors, per gin case	6s. to 10s.
Nectarines, per half-case	3s. to 5s. 6d.
Mangoes (Queensland), per packer	...
Oranges, per case	8s. to 10s.
Passion Fruit, per half-case	2s. 6d. to 4s.
Papaw Apples, per case	4s. to 5s.
Peaches, per gin case	3s. to 4s.
Peanuts, per lb.	5½d.
Pears, per gin case	4s. to 6s.
Pears, per bushel-case	5s. 6d. to 6s.
Pineapples (Queensland), common, per case	3s. to 6s.
Pineapples (Queensland), Ripley, per case	3s. 6d. to 6s. 6d.
Pineapples (Queensland), Queen's, per case	3s. to 6s.
Plums, per half-case	2s. 6d. to 4s.
Rockmelons (N.S.W.), per gin case	2s. 6d. to 4s.
Tomatoes (N.S.W.), per half-case	2s. to 4s.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR
FEBRUARY.

Article.						FEBRUARY.	
						Prices.	
Bacon, Pineapple ...	...	...	...	...	...	lb.	8½d to 10d.
Barley, Malting ...	...	...	...	...	...	bush.	...
Bran ...	...	...	...	...	...	ton	£4 17s. 6d.
Butter, Factory ...	...	...	...	...	...	lb.	7¾d. to 8d.
Chaff, Mixed ...	...	...	...	...	...	ton	£4 15s.
Chaff, Oaten (Victorian dumped)	...	...	...	...	...	"	£5
Chaff, Lucerne ...	...	...	...	...	...	"	£3 10s. to £4
Chaff, Wheaten ...	...	...	...	...	...	"	£3 to £4
Cheese ...	...	...	...	...	...	lb.	5¾d. to 6¼d.
Flour ...	...	...	...	...	...	ton	£9
Hay, Oaten (Victorian) ...	...	...	...	...	...	"	£5 5s.
Hay, Lucerne ...	...	...	...	...	...	"	£2 15s.
Honey ...	...	...	...	...	...	lb.	1½d. to 2d.
Maize ...	...	...	...	...	...	bush.	2s. 2½d.
Oats ...	...	...	...	...	...	"	2s. 10d. to 3s. 4d.
Pollard ...	...	...	...	...	...	ton	£4 15s.
Potatoes ...	...	...	...	...	...	"	£5 10s. to £7
Potatoes, Sweet ...	...	...	...	...	...	cwt.	3s. 6d.
Pumpkins ...	...	...	...	...	...	"	3s.
Pumpkins, Cattle ...	...	...	...	...	...	"	2s. 9d.
Wheat, Milling ...	...	...	...	...	...	bush.	3s. 3d. to 4s.
Onions ...	...	...	...	...	...	ton	£4 to £5
Hams ...	...	...	...	...	...	lb.	10½d. to 1s.
Eggs ...	...	...	...	...	...	doz.	1s. 1d. to 1s. 6½d.
Fowls ...	...	...	...	...	...	pair	1s. 6d. to 3s. 9d.
Geese ...	...	...	...	...	...	"	5s. 6d. to 6s.
Ducks, English ...	...	...	...	...	...	"	2s. 7d. to 3s. 3d.
Ducks, Muscovy ...	...	...	...	...	...	"	3s. 6d. to 4s. 6d.
Turkeys (Hens) ..	...	...	...	...	...	"	6s. 6d. to 7s.
Turkeys (Gobblers)	...	...	...	...	...	"	13s. to 15s.

TOP PRICES, ENOGGERA YARDS, FEBRUARY, 1911.

	Animal.	FEBRUARY.
		Prices.
Bullocks		£7 15s. to £9.
Ditto (single)		..
Cows ...		£7 5s. to £8 2s. 6d.
Ditto (single)		...
Merino Wethers		18s. 9d.
Crossbred Wethers		17s. 9d.
Merino Ewes		15s. 3d.
Crossbred Ewes		20s. 6d.
Lambs		14s. 9d.

PRICES OF FARM PRODUCE FOR FEBRUARY.
LONDON QUOTATIONS.

Article.	FEBRUARY.						Price.
Cotton (Uplands), per lb. ...	...	...	...	...	...	...	7·46d.
Cotton (Sea Island), per lb. ...	...	...	...	...	...	...	20d. to 22d.
Cotton Seed, per ton ...	...	...	...	...	...	...	£8 11s.
Rubber (Parà), per lb. ...	...	...	...	...	...	...	7s.
Copra (S.S.), per ton ...	...	...	...	...	...	...	£24
Copra (Ceylon), per ton ...	...	...	...	...	...	...	£26 15s.
Copra (Malabar), per ton ...	...	...	...	...	...	...	£27 10s.
Hemp (Manila), per ton ...	...	...	...	...	...	...	£19 5s.
Hemp (Sisal) per ton ...	...	...	...	...	...	...	£20
Hemp (Mauritius), per ton ...	...	...	...	...	...	...	£25 to £29.
Ramie Fibre, per ton ...	...	...	...	...	...	...	£33 to £38
Coffee (Santos), per ton ...	...	...	...	...	...	...	£52 9s. to £54
Soja Bean Oil, per cwt. ...	...	...	...	...	...	...	£1 13s.
Soja Beans, per ton ...	...	...	...	...	...	...	£7 10s. to £8 2s. 6d.

Times of Sunrise and Sunset at Brisbane, 1911.

DATE.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		PHASES OF THE MOON.
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	4·56	6·45	5·20	6·42	5·40	6·21	5·57	5·47	8 Jan. ☾ First Quarter 4 20 p.m.
2	4·57	6·46	5·21	6·42	5·41	6·20	5·58	5·46	15 " ○ Full Moon 8 26 a.m.
3	4·58	6·46	5·22	6·41	5·42	6·19	5·58	5·45	22 " ☾ Last Quarter 4 21 p.m.
4	4·58	6·46	5·23	6·41	5·42	6·18	5·59	5·44	30 " ● New Moon 7 45 "
5	4·59	6·47	5·24	6·40	5·43	6·17	5·59	5·43	
6	5·0	6·47	5·24	6·39	5·43	6·16	6·0	5·42	
7	5·1	6·47	5·25	6·39	5·44	6·14	6·0	5·40	
8	5·1	6·47	5·26	6·38	5·44	6·13	6·1	5·39	7 Feb. ☾ First Quarter 1 28 a.m.
9	5·2	6·47	5·26	6·38	5·45	6·12	6·1	5·38	13 " ○ Full Moon 8 37 p.m.
10	5·3	6·47	5·27	6·37	5·46	6·11	6·2	5·37	21 " ☾ Last Quarter 1 44 "
11	5·3	6·47	5·28	6·36	5·46	6·10	6·2	5·36	
12	5·4	6·47	5·29	6·35	5·47	6·9	6·3	5·35	
13	5·5	6·47	5·29	6·35	5·47	6·8	6·3	5·34	
14	5·6	6·47	5·30	6·34	5·48	6·7	6·4	5·33	1 Mar. ● New Moon 10 31 a.m.
15	5·7	6·47	5·31	6·33	5·48	6·6	6·4	5·32	8 " ☾ First Quarter 9 1 "
16	5·7	6·47	5·32	6·32	5·49	6·5	6·5	5·31	15 " ○ Full Moon 9 58 "
17	5·8	6·47	5·32	6·31	5·50	6·4	6·5	5·30	23 " ☾ Last Quarter 10 26 "
18	5·9	6·47	5·33	6·31	5·50	6·3	6·6	5·29	30 " ● New Moon 10 38 p.m.
19	5·10	6·47	5·34	6·30	5·51	6·1	6·7	5·28	
20	5·11	6·47	5·34	6·29	5·51	6·0	6·7	5·27	
21	5·11	6·46	5·35	6·28	5·52	5·59	6·8	5·26	
22	5·12	6·46	5·36	6·27	5·52	5·58	6·8	5·25	
23	5·13	6·46	5·36	6·26	5·53	5·57	6·9	5·24	
24	5·14	6·45	5·37	6·25	5·53	5·56	6·9	5·23	6 Apr. ☾ First Quarter 3 55 p.m.
25	5·15	6·45	5·38	6·24	5·54	5·55	6·10	5·22	14 " ○ Full Moon 0 37 a.m.
26	5·15	6·45	5·38	6·23	5·54	5·54	6·10	5·21	22 " ☾ Last Quarter 4 36 "
27	5·16	6·44	5·39	6·23	5·55	5·53	6·11	5·20	29 " ● New Moon 8 25 "
28	5·17	6·44	5·40	6·22	5·55	5·51	6·11	5·19	
29	5·18	6·44	...	...	5·56	5·50	6·12	5·19	
30	5·19	6·43	...	...	5·56	5·49	6·12	5·18	
31	5·20	6·43	...	...	5·57	5·48	...	...	

Orchard Notes for May.

THE SOUTHERN COAST DISTRICTS.

The advice given respecting the handling and marketing of citrus fruits in the last two numbers of this journal applies with equal force to this and the following months. Do not think that you can give the fruit too much care and attention; it is not possible, as the better they are handled, graded, and packed the better they will carry, and the better the price they will realise.

Continue to pay careful attention to specking, and fight the blue mould fungus everywhere. Don't let mouldy fruit lie about on the ground, hang on the trees, or be left in the packing-shed, but destroy it by burning. Keep a careful lookout for fruit fly, and sweat the fruit carefully before packing. If this is done, there will be little fear of the fruit going bad in transit or being condemned on its arrival at Southern markets. Where the orchard has not been already cleaned up, do so now, and get it in good order for winter. Surface working is all that is required, just sufficient to keep moisture in the soil; keep down undergrowth, and prevent the packing of the surface soil by trampling it down when gathering the fruit.

Keeping the orchard clean in this manner enables any fallen fruit to be easily seen and gathered, and it need hardly be stated, what has been mentioned many times before, that diseased fruit should on no account be allowed to lie about and rot on the ground, as this is one of the most frequent causes of the spreading of many fruit pests.

May is a good month to plant citrus trees, as if the ground is in good order they get established before the winter, and are ready to make a vigorous growth in spring.

Don't plant the trees, however, till the land is ready, as nothing is gained thereby, but very frequently the trees are seriously injured, as they only make a poor start, become stunted in their growth, and are soon overtaken by trees planted later, that are set out under more favourable conditions. The land must be thoroughly sweet, and in a good state of tilth—that is to say, deeply worked, and worked down fine. If this has been done, it will probably be moist enough for planting; but should there have been a dry spell, then when the hole has been dug and the tree set therein, and the roots just covered with fine top soil, 4 to 8 gallons of water should be given to each tree, allowed to soak in, and then covered with dry soil to fill up the hole. In sound, free sandy loams that are naturally scrub, holes may be dug and the trees planted before the whole of the ground is brought into a state of perfect tilth. It is, however, better to do the work prior to planting, as it can then be done in the most thorough manner; but if this is not found possible, then the sooner it is done after planting the better. If the land has been thoroughly prepared, there is no necessity to dig big holes, and in no case should the holes be dug deeper than the surrounding ground either is or is to be worked. The hole need only be big enough to allow the roots to be well spread out, and deep enough to set the tree at the same depth at which it stood when in the nursery. Plant worked trees 24 to 25 ft. apart each way, and seedlings at least 30 ft. apart each way.

Towards the end of the month cover pineapples when there is any danger of frost; dry blady grass or bush hay is the best covering. Keep the pines clean and well worked—first, to retain moisture; and, secondly, to prevent injury from frost—as a patch of weedy pines will get badly frosted when a clean patch alongside will escape without any serious injury.

Slowly acting manures—such as meatworks manure when coarse, boiling-down refuse, farm manure, or composts—may be applied during the month, as they will become slowly available for the trees' use when the spring growth takes place; but quickly-acting manures should not be applied now.

TROPICAL COAST DISTRICTS.

May is a somewhat slack month for fruit—pines, papaws, and granadillas are not in full fruit, the autumn crop of citrus fruit is over, and the spring crop only half-grown. Watch the young citrus fruit for Maori, and when it makes its appearance spray with the sulphide of soda wash. Keep the orchard clean, as from now till the early summer there will not be much rain, and if the orchard is allowed to run wild—viz., unworked and dirty—it is very apt to dry out, and both the trees and fruit will suffer in consequence.

Bananas should be kept well worked for this reason, and, though the fly should be slackening off, every care must still be taken to prevent any infested fruit being sent to the Southern markets.

Citrus fruits can be planted during the month, the remarks *re* this under the heading of the Southern Coast Districts being equally applicable here.

SOUTHERN AND CENTRAL TABLELANDS.

Get land ready for the planting of new deciduous orchards, as, although there is no necessity to plant so early, it is always well to have the land in order, so as to be ready to plant at any time that the weather is suitable. The pruning of deciduous trees can commence towards the end of the month in the Stanthorpe district, and be continued during June and July. It is too early for pruning elsewhere, and too early for grapes, as a general rule. Keep the orchard clean, particularly in the drier parts. In the Stanthorpe district grow a crop of blue or grey field peas or a crop of vetches between the trees in the older orchards as a green manure. The crop to be grown as a green manure should have the soil well prepared before planting, and should be manured with not less than 4 cwt. of phosphatic manure, such as Thomas' phosphate or fine bonedust, per acre; the crop to be ploughed in when in the flowering stage. The granitic soils are naturally deficient in organic matter and nitrogen as well as phosphoric acid, and this ploughing in of a green crop that has been manured with a phosphatic manure will have a marked effect on the soil.

Lemons will be ready for gathering in the Roma, Barcaldine, and other districts. They should be cut from the trees, sweated, and cured down, when they will keep for months and be equal in quality to the imported Italian or Californian fruit. If allowed to remain on the trees, the fruit becomes over-large and coarse, and is only of value for peel. Only the finest fruit should be cured; the larger fruit, where the skin is thicker, is even better for peel, especially if the skin is bright and free from blemish; scaly fruit—scabby, warty, or otherwise unsightly fruit—is not suitable for peel, and trees producing such require cleaning or working over with a better variety, possibly both.

The remarks *re* other citrus fruit and the work of the orchard generally, made when dealing with the Coast Districts, apply equally well here, especially as regards handling the crop and keeping down pests.

Farm and Garden Notes for May.

FIELD.—During this month the principal work in the field will be the sowing of wheat, barley, oats, rye, and vetches. There is no time to lose now in this work. Potatoes should be hilled up. Cut tobacco. The last of the cotton crop should now be picked, the bushes being stripped daily after the dew has evaporated. Growers are notified that Messrs Kitchen and Sons in the Valley, Brisbane, and Messrs. Joyce Brothers, of Ipswich, are buyers of seed cotton, so that a sure means of disposing of the crop is available. Every effort should be made to ensure feed for stock during the winter, by utilising all kinds of green fodder, in the form of ensilage or hay. Those who own dairy stock will be wise to lay down permanent grasses suitable to the climate and to their particular district and soil. A few acres of artificial grass will support a surprisingly large number of cattle or sheep in proportion to acreage. Couch grass in the West, as has been proved at Barcaldine, will carry 10 or 12 sheep to the acre. Coffee-picking should now be in full swing, and the berries pulped as they are picked. Strawberries may be transplanted. The best varieties are Pink's Prolific, Aurie, Marguerite, Haut-bois, and Trollope's Victoria. The Aurie is the earliest, and the Marguerite next. In some localities strawberry planting is finished in March, and the plants bear their first fruits in August. In others, fruit may be gathered in July, and the picking does not end until January.

KITCHEN GARDEN.—Onions which have been planted in seed beds may now be transplanted. The ground should have been thoroughly cleaned, pulverised, and rolled previous to transplanting. Onions may still be sown in the open on clean ground. In favourable weather plant out cabbages, cauliflowers, lettuce, leeks, beetroot, endive, &c. Sowings may also be made of all these, as well as of peas, broad beans, kohlrabi, radishes, spinach, turnips, parsnips, and carrots. Dig and prepare beds for aparagus.

FLOWER GARDEN.—Transplanting and planting may be carried out simultaneously during this month in showery weather; the plants will thus be fully established before the early frosts set in. Camellias and gardenias may be safely transplanted, also such soft-wooded plants as verbenas, petunias, penstemons, &c. Cut back and prune all trees and shrubs ready for digging. Dahlia roots should be taken up and placed in a shady situation out of doors. Plant bulbs, such as anemones, ranunculus, snowflakes, freesias, ixias, iris, narcissus, &c. Tulips and hyacinths may be tried, but success in this climate is very doubtful. All shades and screens may now be removed to enable the plants to get the full benefit of the air. Fork in the mulching, and keep the walks free from weeds. Clip hedges and edgings.

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NOTICE.**Queensland Agricultural Journal.**

It is hereby notified that the *Journal* will be supplied to all members of Agricultural and Horticultural Societies who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Schools of Arts will be supplied at the same rate.

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Agriculture.

BROOM MILLET.

By G. MARKS, Instructor of Agriculture, Hawkesbury Agricultural College, N.S.W.

[The cultivation of broom millet in Queensland is largely extending, the industry having received a considerable impetus in consequence of the increased prices due to the demand for good fibre within the State, where, up to the present, the supply has been utterly inadequate to the wants of the broom manufacturers. In order to give all information on the subject to present, and intending growers, we have, from time to time, published articles on the cultivation and subsequent treatment of the fibre. Lately a most excellent and exhaustive bulletin on broom millet, profusely illustrated, written by Mr. G. Marks, Instructor in Agriculture at the Hawkesbury Agricultural College, New South Wales, has been issued by the Department of Agriculture in that State, and we are permitted to reproduce it, together with the illustrations, in the "Queensland Agricultural Journal." A thousand copies of the paper have been issued in New South Wales, and we feel sure that equal interest will be taken in the subject in this State.—Ed. "Q.A.J."]

From time to time numerous inquiries are received from different parts of the State asking for information regarding the cultivation, harvesting, and marketing of broom millet. During recent years the price has fluctuated considerably, according to the supply and demand, and in the seasons which follow an unusually high market, many farmers attempt to grow this crop who have but a slight knowledge of the requirements of the plant, and of the practical details from the selection of the seed to the harvesting, curing, baling, and marketing of the brush. The result is, that the market is glutted with millet of inferior quality, and the returns give little, if any, profit to the grower. We have in New South Wales soil and climate admirably adapted for the production of the best quality brush, and it is significant that those growers whose practical knowledge teaches them to produce only the very best are handsomely repaid for their outlay.

REQUIREMENTS OF THE TRADE.

In the manufacture of brooms, three classes of brush are required, which are popularly known as "inside," "cover," and "hurl."

"Inside" millet is used for forming the inside of the broom, and is generally not more than 17 in. long.

"Cover" is the class used for covering the inside and also for forming the shoulders. It is longer than the former, and must be from 17 to 20 in. in length.

"Hurl" is the longest brush, ranging from 20 to 25 in. It must also be fine and straight, and forms the outside covering of the broom. To give a nice finished appearance, only prime hurl can be used.

About 1½ lb. of brush are required to make an ordinary broom, and the three grades are used in about equal proportions.

The soil, climate, and methods of cultivation determine largely the quality of the brush, but in an average season there would be sufficient of each produced to satisfy the requirements of the trade. When grown under exceptionally favourable conditions, a larger proportion of long brush is produced. It may be used as covers, but owing to its length

a certain amount has to be cut off, so that its use for this purpose causes unnecessary waste. On the other hand, a dry season will have the effect of stunting the growth, producing a large percentage of "inside" millet, which can only be worked in the inside of brooms. Manufacturers have consequently to purchase elsewhere to satisfy their requirements.

It is not intended to go into detail concerning the manufacture of brooms, as this does not exactly concern the grower. Manufacturers require certain classes, and the farmer should aim at producing those classes which invariably give profitable returns.

CONDITION OF OUR SUPPLY.

At the present time there is a great deal of dissatisfaction amongst purchasers concerning the manner in which locally-grown millet is placed upon the market—so much so that the export trade has been injured, and the attention of the Federal Authorities has been drawn to certain dishonest practices with the view of bringing broom millet under the provisions of the Commerce Act. Whilst a large number of producers grade and bale their millet in a manner that compares favourably with the imported article, it is to be regretted that a certain section pay very little attention to these details. The chief faults may be divided into two classes—1st, those the result of ignorance and carelessness; and, 2nd, those which are brought about by unscrupulous individuals with the sole object of obtaining an unfair and undue advantage over the producer. Those of the former class may be summarised as follows:—

1. The millet is not graded. All classes are packed indiscriminately in a bale.
2. The seed is not removed, or only partially so.
3. Broken, bent, or coarse brush is mixed with the good.
4. The cut is not uniform. Some are cut close to the brush, others have 10 or 12 in. of stalk.
5. The colour is not uniform.
6. Bales badly packed and pressed. Many are irregular in size and shape, are not bound with a sufficient number of wires to stand ordinary handling.
7. Brush destroyed by being packed before it is properly dried, causing it to develop moulds of various descriptions.
8. Absence of distinguishing numbers or marks signifying the quality and weight.

A few of the latter class may be mentioned:—

1. The use of heavy billets of timber in bales.
2. Watering the interior of bales when packing with millet that has been properly dried.
3. Placing in the bales bundles of stems and leaves, useless brush, bagging, scrap-iron, sweepings of floors, quantities of unripe seed, &c.
4. Dressing the outside of bales with prime hurl and the middle with inferior material with the seed left on.

It is unnecessary to enlarge upon some of these dishonest practices, as their effect upon any market must be injurious. Owing to the bales being tightly pressed, and from 4 to 5 cwt. in weight, it is not always easy to detect these faults till they are opened in the factory. However, buyers are naturally becoming very alert, and they are compelled to give lower prices, on account of the risk they run. Many manufacturers prefer to leave the local product alone, and import their supplies, finding it cheaper to purchase Italian millet at £40 per ton than use local

material at £20. The size, shape, and general appearance of bales is fairly constant with individual growers, so that buyers very soon become familiar with them. These dishonest practices have already severely affected the New Zealand trade, and our millet is being replaced by



FIG. 1.—BROOM MILLET.

- A—Italian Hurl, showing how it is put up in bundles of uniform quality.
 B—Samples of brooms made from same.
 C—Samples of brooms made from New South Wales millet.

Italian and Californian samples. As a consequence, every honest grower has to suffer through the evil reputation that his trade has acquired, and receive considerably lower prices for a first-class article, because of the fear that the agents will have to make some allowance to the buyers on account of possible adulteration. The demand for broom millet in

this State is limited; and if its production is to be extended and made profitable, it is essential that the export trade be encouraged in every possible way. The local producer at the present time is protected by a Federal duty of £4 per ton.

Fully 90 per cent. of the millet produced in this State is grown on the rich alluvial lands of the North Coast; and on several of the rivers—notably the Hunter, Manning, and Richmond—the industry may be looked upon as lucrative and permanent. Many farmers have

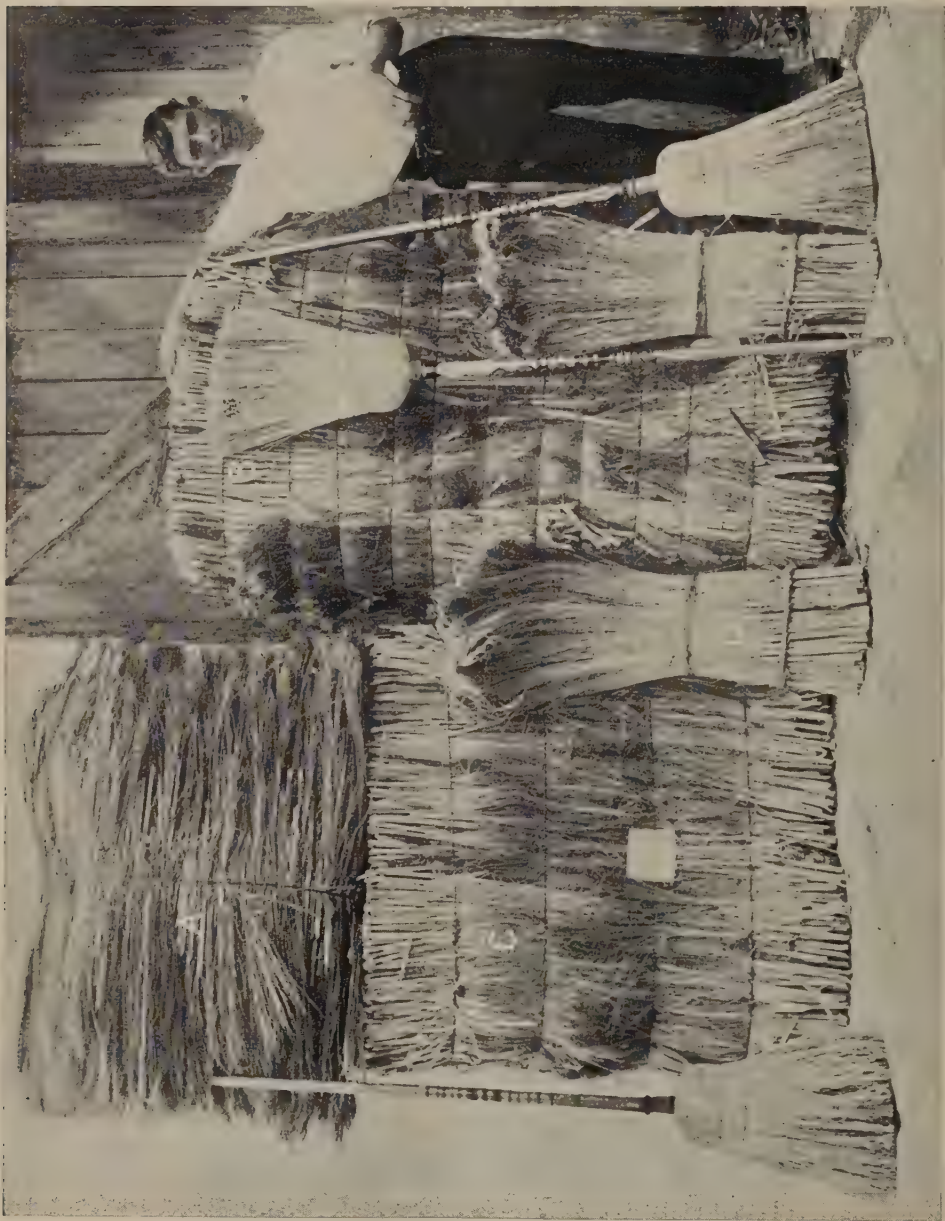


Fig. 2.

reported their success with this crop, and would not think of reverting to the far less remunerative occupation of maize-growing. The raising of millet need not be confined to these districts, as, with the necessary care, and the aid of a few home-made contrivances, any land which produces 25 or more bushels of maize to the acre will yield profitable returns. On many of our western slopes millet should also thrive, particularly in those localities where irrigation can be carried out. It is advisable, before entering extensively into the production of brood

millet, to ascertain from agents or manufacturers the probable requirements of the trade, with the view of obtaining an idea of the prices likely to be obtained during the season. At the same time, should the prices fall after the crop is harvested, the millet may, if properly cured and baled, be stored for a considerable length of time without injury.

The following information may enable beginners in broom millet growing to avoid some common mistakes, and not to neglect any of the important operations which are essential to success:—

WHAT BROOM MILLET IS.

Andropogon sorghum vulgare is a non-saccharine variety of sorghum. It is an annual, somewhat similar in appearance to maize while young; but it has thinner stems and narrower leaves, and, instead of having male and female flowers on separate parts of the plant, they are both found together in the brush at the top. The flowers are of two kinds—perfect and imperfect. The former are set directly upon the branch, and are accompanied by some of the latter, raised upon little stalks. The fine stems of the panicle or brush are the valuable portions; the other parts are incidental. The brush should be composed of seed stems, uniform in size, length, elasticity, and toughness, and of a nice bright colour. The soil and general methods of cultivation will largely affect the character and quality of the product, even though good seed be used. By long and careful cultivation and systematic selection certain desirable qualities have been developed and fixed, which remain only so long as the conditions which brought these changes about are reasonably observed. When a plant is grown for a particular purpose it should be the cultivator's aim to keep improving it in the direction most profitable to him. This necessitates a careful study of the plant and its requirements, and the conditions which make for its proper development. In broom millet it is not desirable to obtain a heavy yield of seed, a large development of stalk and leaf, or a sap full of saccharine material,



FIG. 5.
A Broom Millet Plant, White Indian Variety
—one of the best kinds grown in
New South Wales.

but a special and unusual development of the long, thin stems of which the brush is composed. It makes very little difference whether a large plant is produced or a heavy crop of seed is obtained, provided these stems are long and fine.



Fig. 3.
Bunch of It-lin millet showing the evenness and the uniform quality throughout.

CLASS OF LAND REQUIRED.

The soil requirements of broom millet are similar to those of maize. The best results are obtained from the deep, rich, well drained alluvial lands of our rivers. It is, however, capable of adapting itself to a variety of conditions, and, with proper care and attention, sandy and even gravelly soils, if thoroughly drained, will produce fair returns.

Undrained lands make the working and cultivation more difficult; the growth is generally slow and uneven, and there is always the liability of the crop becoming stunted and diseased. To ensure evenness in ripening, a soil uniform in character and fertility is essential.



FIG. 4.
Bales of Hunter River Broom Millet.

PLACE IN THE ROTATION.

In the general rotation on the farm, broom millet takes the same place as maize. It is not advisable to adopt the practice of growing it in the same piece of land continuously, unless suitable fertilisers are

applied. It has been found, however, in dry seasons, that it does not thrive as well on land following millet as where the previous crop was maize. The reason of this appears to be that, being more drought-resistant, it continues to grow, and thus exhausts the soil of its supplies of moisture and plant-food, when maize would probably cease growing. At the same time, as the brush is usually harvested soon after the flowers have set, the crop can scarcely be classed as a very exhaustive one, particularly if the stalks are cut down immediately afterwards. Where possible, it should follow a leguminous or root crop.

PREPARATION OF THE LAND.

To obtain the best results, the land must be properly prepared and brought to a fairly fine tilth before sowing. The previous treatment should be such as would destroy weed seeds. The presence of weeds in the early stages seriously interferes with the growth and cultivation of the young plants. Deep ploughing is recommended. This not only ensures greater feeding room for the roots, but it also has the effect of increasing the moisture-carrying capacity of the soil—a fact which must always be remembered, especially in those districts where the rainfall is limited and irregular.

The nature of the subsoil must also be considered. Clays should not be brought to the surface, but can be materially improved by subsoiling. Ploughing operations should be commenced a couple of months before sowing time. This not only allows the land to sweeten by exposure to the weather, but all vegetative growth turned under is generally well decomposed by the time the second ploughing takes place. In early spring the land should be well fined down by means of the harrow, disc, roller, &c.

SOWING AND CULTIVATION.

Sowing should not take place until all danger of frost is over and the soil is thoroughly warmed, so that the seed will germinate at once. September, October, and November are usually the best months. If planted too early, there is not sufficient heat in the soil to cause the seed to germinate, and it will either rot or the young plants will be so weak that the weeds will very quickly outgrow and smother them. It may be sown about the same time as maize, or two or three weeks later, with advantage. Drills 4 or 5 in. deep are struck out with a plough (a double mould-board one is preferable) about 3 or 3½ ft. apart, and the seed planted along these by hand or machine. The latter is preferable, as it sows more uniformly; and, by using a fertiliser attachment, chemical fertilisers may be applied at the same time. An ordinary maize seed-drill, which sows and covers the seed in the one operation, is one of the best for the purpose. During hot or dry weather the seed should be sown soon after the drills are opened, and before the soil has had time to dry. When this system is adopted, hilling can be dispensed with. It prevents a great deal of evaporation from the soil by exposing a smaller surface. Besides this, the plants, having their roots deep in the soil, have plenty of support, and are not so quickly affected by dry weather. The amount of seed varies from 5 to 8 lb. to the acre. When the plants are 6 in. high, they should be thinned out to 3 or 4 in. apart for rich soil, and more space allowed each plant in poor ground. With good, clean, and evenly-graded seed, the sowing may be adjusted so that very little

thinning is necessary, thereby saving a tedious and rather expensive operation. The quality of the brush is affected to a very large extent by the manner in which this thinning is carried out. If too much space is allowed, the plants grow very strong and vigorous and produce brush which is coarse and unsuitable for market. On the other hand, if crowded too much they become very fine and weak. To obtain an even crop, it is essential to have uniform sowing and germination, and later on to thin the plants to a uniform distance. Some growers prefer to sow the seed in "hills," 15 to 20 in. apart in the drills, leaving from six to ten stalks to each. The seed should be covered from $\frac{1}{2}$ to 1 in. deep, the depth depending upon the character and condition of the soil. If it is dry, deeper covering is more necessary than would be the case if the soil were in a good moist condition. Where labour is scarce, several sowings should be made in succession to enable the grower to deal with his crop at regular intervals, and not have the whole area mature at the same time. Rolling the land as the seed is planted ensures a quicker germination and a better stand, particularly if the soil is a little dry. When drilled, the roller at the rear of the machine is quite sufficient. Should heavy rains fall after sowing, and before the seed has germinated, a light harrow should be used as soon as the condition of the soil will admit. When 6 in. high, the crop may be harrowed to keep the soil loose and to gradually fill in the drills, and thus destroy any young weeds. Broom millet makes rather slow growth for the first couple of weeks, and the cultivator should be kept going every fortnight or three weeks, to keep the surface soil loose and friable, to conserve moisture, and prevent weed growth, and in every instance after rains. For large areas, a two-horse spring tine cultivator may be used. When the crop is half grown, under favourable conditions cultivation may cease; in any case the surface roots must not be disturbed by cultivating too deeply. In moist and exposed situations the crop may be lightly hilled, as an extra support is necessary. It is during the early stages of growth that the cultivator is of greatest value, as the soil may then be loosened fairly deeply. The most critical period is when the heads are forming. If dry weather should set in then, the brush will be short and stunted. It may be necessary in some districts to sow early or late in the season so that the crop will not come into flower during such trying conditions. Where irrigation is practised, it is essential to plant in suitably graded land and convey the water by means of open drills between the rows. After each application of water, and as soon as the nature of the soil will allow, the soil must be well cultivated to prevent caking and to conserve moisture.

MANURING.

On soils that are somewhat poor, it is advisable to apply fertilisers. Such crops as cowpeas, field-peas, vetches, and clovers are suitable for green manuring, and may be ploughed under when they have reached the blooming stage or have been grazed off by stock. This latter system works well when mixed farming is carried out, and stock of different kinds are kept. Any vegetable matter should be ploughed under early, to give it ample time to decompose before sowing. Farmyard manure, if available, is also a first-rate manure to apply, as it not only supplies the elements required by the plants, but also improves the mechanical condition of the soil. Chemical manures are also valuable, and are very easily applied. Superphosphate, bone-dust, dried blood, and sulphate of potash will be found the most suitable. The quantities used for maize or sorghum will do equally well for broom millet. The following make

a complete fertiliser, and may be applied at the rate of 2 to 2½ cwt. per acre:—

Superphosphate	..	..	..	..	80 lb.
Dried blood	..	..	..	..	64 „
Bone-dust	..	..	..	..	50 „
Sulphate of potash	..	..	..	..	30 „

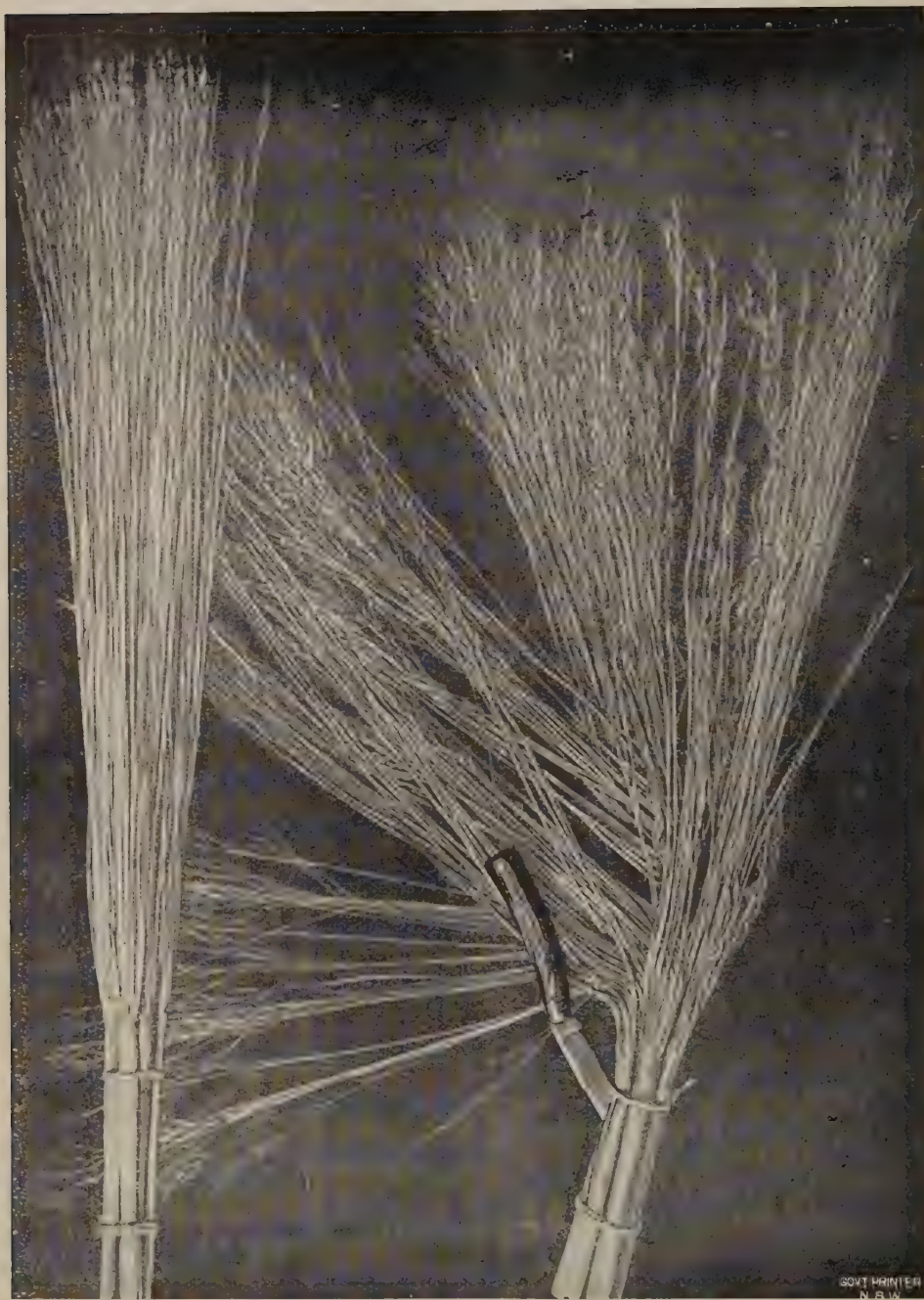
*a**b*

FIG. 6.

(a) A good sample of brush.

(b) Sample of brush from a neglected crop.

The manures should be passed through a sieve, to remove lumps and foreign substances that would prevent them from passing freely through the drills. They should be thoroughly mixed just before sowing, as, if

mixed any great length of time before required, they are very liable to "set," especially if the weather is at all damp, and this necessitates breaking up and re-screening before use. It is impossible to state definitely what quantity of manure is required for each class of soil. Growers would do well to conduct experiments on a small scale with manure, mixed in varying proportions, and to notice which give the best results. Soils, even in one locality, often vary considerably in their chemical and physical characters, and by such tests the farmer may soon determine the most suitable mixture for his land. An excessive dressing of manure tends to produce a strong coarse brush.

BENDING THE HEADS OVER.

The practice of bending the heads over is not carried out extensively in this State, and as a result a large amount of bent brush is sent to market, which can be used only as "insides" or "covers." In many parts of the United States of America this operation is never neglected. When allowed to grow in the natural way, a large percentage of the brush will spread out, and bend over on account of the weight of the seed, and thus reduces its marketable value. This is especially the case if there is good rain when the brush is forming. The rapid growth causes the panicles composing the head to become tender, and unable to bear the weight of the growing seed. Strong winds, at this particular period, will also cause this, and grain-eating birds, when plentiful, are sometimes responsible for a great deal of damage. The illustrations, Fig. 6b and Fig. 8, show samples of the brush thus destroyed.

This loss may be prevented by bending the head over, and the weight of the seed in maturing will cause the brush to lie close and straight. The turning must be done between the joints or nodes, as if done on the joints the stem will snap and the top die off. The bending checks the flow of sap a little, but the growth in the head is not materially affected. This operation is performed when the seed is beginning to fill out, and the brush shows signs of spreading.



FIG. 7.

A stalk of Broom Millet with the head turned down.

It should be understood that it is quite possible to grow millet without turning down the heads. Some of the best millet on the market is grown by farmers who do not favour the operation. At the same time, there are seasons when a fairly large percentage is completely



FIG. 8.

An instance where artificial bending-down would have been profitable.

spoilt, and such losses could have been prevented by the adoption of this system. The stalks are bent about a foot below the base of the head, and, if the plants are very tall, there may be two bends, as shown in illustration, Fig. 7. The heads should hang clear of the ground, so that they will not be damaged by rubbing, or discoloured by the splashing of mud in rainy weather.

HARVESTING AND CURING.

No matter what care has been bestowed upon the cultivation of the crop, sound judgment must be exercised at time of harvesting. An excellent crop may be brought successfully as far as this stage, and yet the result may be unprofitable on account of inattention to, or ignorance of, some apparently unimportant detail. The time to harvest and the various other operations required to prepare the millet for market are such as require some experience in order to do them properly. Even experienced growers are not unanimous on the point of when to harvest the brush, some cutting the heads when in blossom, and others harvesting later so as to obtain better developed seed possessing considerable nutritive value. The time to cut will depend upon the weather and the colour required. Manufacturers generally prefer a millet having a green



FIG. 9.
Drying Millet in the field.

tinge. It is then much tougher than when allowed to become nearly ripe. To obtain this green colour the millet should be cut when the seeds are in what may be called the dough stage. The brush is then fully developed, but the grain is soft. For some classes of goods a golden colour is preferred, in which case the crop is left till the grain is fairly firm. With a little experience it is easy to harvest a large area, and yet maintain a uniform tint. A strong knife (a pruning knife is very suitable) is used to cut the brush, and at least 6 in. of stalk should be left on. In dwarf varieties the brush should be pulled instead of cut. Select fine weather for this operation. Some growers bend the stalks of drills towards each other diagonally, about 2 or 3 ft. from the ground, forming a sort of platform upon which the cut heads are placed to dry. Others cut the whole of the stalks, and lay the millet upon them.

DRYING IN THE FIELD.

In this State the millet may be properly dried in the field during the greater portion of the summer months. Should thunderstorms occur, the brush must be placed in heaps and covered with tarpaulins, sheets of iron, or other material. The time required for drying depends upon the season, but still, with fine bright weather, two days should be sufficient. The brush must not be allowed to get wet, as rain or dew soon discolours it.

DRYING UNDER COVER.

The finest colour is obtained by drying under cover, or away from the direct rays of the sun. The millet is left a couple of hours in the field for some of the moisture to evaporate before being taken to sheds fitted up with racks one above the other, so that the brush may be spread out in layers about 3 in. deep. It must be turned regularly at frequent intervals, and when nearly dry may be placed in thicker layers. This method requires plenty of space and a good deal of attention, and it takes longer to dry.

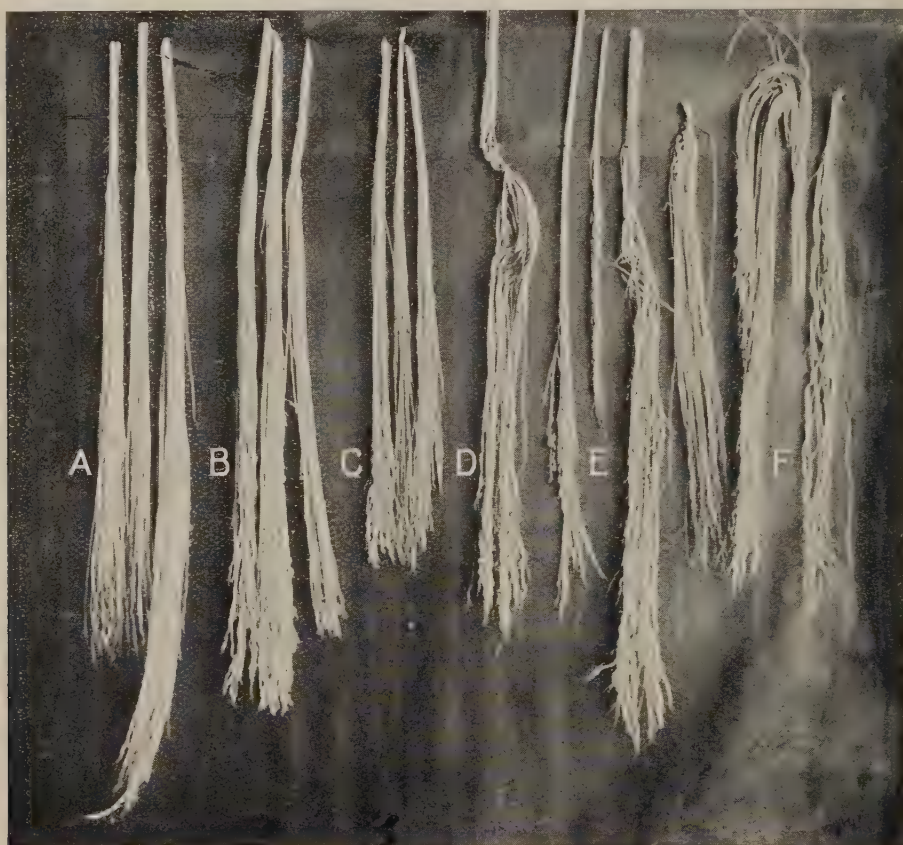


FIG. 10.

Samples of Millet Heads, from prime (A and B) to rubbish (D, E, F).

REMOVAL OF THE SEED.

The seed is removed by means of a hackler.

The machine consists of a roller studded with small iron spikes, mounted in a frame and made to revolve at high speed. A handful of the brush is held so that the roller comes in contact with the seeds, which are speedily stripped off. A firm at Morpeth specialise in millet machinery, and supply these in hand, horse, or belt power for about £4 10s. and £5 10s. respectively.

For small quantities a handy man can very easily make one, but it is best to purchase one, properly constructed, for treating large amounts.

GRADING.

The grading of millet is most important, and must not be overlooked. While grading cannot be done so cheaply or expeditiously on the farm as in the factory, still, in the grower's "own interest, it is essential that some grading be done." It should be sorted into at least three

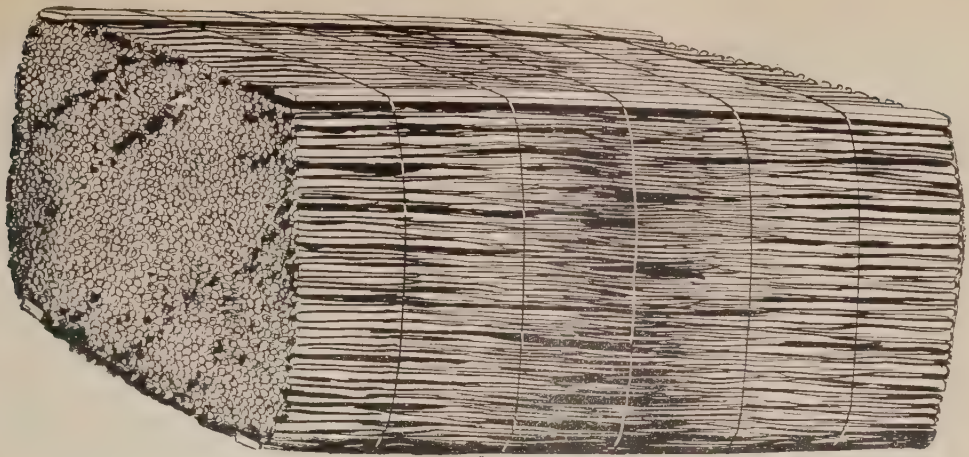


FIG. 11.

A bale of Broom Millet.

classes—"Inside," "Covers," and "Hurl"; and any which cannot be honestly included in any of these classes should be discarded. Green and golden should also be kept separate.

BALING.

The various grades should be baled separately. For this purpose a press is required. One used for lucerne or other hay can be conveniently adapted for this purpose. It is important, especially where space is charged for in freight, to reduce the bulk as far as possible. The brush is laid with butt ends outwards and the heads overlapping in the middle. Battens may be placed on top and bottom of the bales, and when pressed the whole is secured by five fairly stout wires. The size varies with individual growers; but a bale 46 in. x 30 in. x 24 in., and weighing from 300 to 400 lb., can be recommended. Each bale should be legibly branded with an indication of the quality. There are several styles of home-made presses in use, but one that is coming largely into favour is made on similar lines to a wool-press, having wire ropes and a lever.

YIELD.

The yield ranges from 10 to 15 cwt. of clean marketable brush, and 25 to 30 bushels of seed per acre. The price of broom millet fluctuates considerably with the season; and while it may vary from £18 to £40 per ton, the general average for prime hurl may be set down at £30, cover millet at £25 to £30, and inside millet at £20 per ton. Should the prices, however, be somewhat low when harvesting takes place, the millet may be stored for any length of time without deterioration, and disposed of when higher prices are obtainable.

On account of the seed not being properly developed, it is best to consume it on the farm. Its value may be estimated at 4s. per 4-bushel bag.

SELECTION OF THE SEED.

Special attention must be given to the selection of the seed. That obtained in the process of stripping should not be used for sowing. The practice of using such would speedily lead to deterioration and the production of inferior brush.

Good reliable seed can only be obtained by sowing in special areas and allowing the plants to mature their seed naturally. Individual plants may be allowed to ripen their seed in an ordinary field, but there is always a danger of them being hybridised by pollen from plants having inferior brush. In any case, seed should be obtained from those

which produce the best heads. By proper cultivation and selection the quality and yield of any variety may be improved. Where seed-eating birds are troublesome, it may be necessary to cover the heads with some light material, such as muslin, when the seed is commencing to fill out. The ends must be tied loosely round the stalk so as not to interfere with the free circulation of the sap. After harvesting, the heads are thoroughly dried, threshed, cleaned, and kept in a place secure from weevils and damp.

Where the conditions for saving seed are not suitable it is best to purchase from reliable seedsmen. There are several varieties on the market, but so far White Italian has given the best results in this State. At the same time, growers are advised to experiment with new varieties from time to time, or introduce fresh strains of those kinds they have in constant cultivation, with the view of finding out what particular kind is most suitable to their conditions.

BY-PRODUCTS.

The object of the cultivator should be to produce brush of the best quality; consequently all other use of the plant must give way to this. In former years millet was allowed to develop a fair proportion of seed, but the diminished value of the brush was not compensated for by the value of the seed obtained. The finest green brush is usually obtained while the seed is in an immature condition, but in the production of good golden-coloured millet a fair proportion of the grain is more or less developed. This contains an amount of nutriment, and can be utilised for the feeding to stock, thus assisting in reducing the expenses of the crop. It is, however, generally more or less soft and doughy, and, if intended to be kept for any great length of time, should be thoroughly dried by spreading out in thin layers on tarpaulins. Growers who insist upon ripening their seed will secure brush of an inferior quality, which brings a low price upon the market, and if exported injures the trade.

STALKS AND LEAVES.

The plant cannot be recommended as a particularly useful one for feeding purposes. While young a certain amount of sugar exists in the sap, but this soon disappears, and by the time the brush is cut the stalks are more or less dry or pithy, and contain a large proportion of fibre matter which is unpalatable. For this reason very little use is made of them beyond turning stock in after the harvest to feed upon the leaves. The refuse should afterwards be cut up with a heavy disc harrow, or cornstalk cutter, and ploughed under for manure.

PROSPECTS.

As the demand for broom millet in the Sydney market is limited, it is not wise to undertake the cultivation of extensive areas, unless the product is properly prepared and suitable for export. For this purpose, prime brush only should be baled; and, if the necessary details in harvesting and curing have been observed, there is no reason why millet should not be exported in a wholesale and profitable manner. On almost every farm the implements to plant and cultivate the crop are found. It will not pay any farmer to obtain the necessary apparatus to treat his brush unless he intends to grow the crop for a number of years. When prepared to do this, and he produces and sends to market millet of the best quality only, it will be found a very remunerative undertaking. In districts where freights are considerable, growers might co-operate and establish small factories, where the whole or portion of their brush could be profitably made up into brooms for supplying the local market.

COTTON GROWING IN EGYPT.

In a most interesting address on the resources and development of Egypt and the Anglo-Egyptian Soudan, delivered in the Town Hall, Manchester, on 13th October, 1910, by the Right Honourable Sir William Mather, M.I.C.E., LL.D., special mention was made of cotton-growing and its progress in the land of the Pharaohs. The method adopted by one large British company in the Berber district, north of Khartoum, established at Zeidab, on the west bank of the Nile, was fully explained; and it is of peculiar interest to Queenslanders who are establishing the cotton industry in Central and Northern Queensland, entirely unaided by the State.

This Berber enterprise is so conducted that it creates a population of cotton-growers, whose profits are such that they are very soon enabled to finance their own operations, although they commence with nothing.

The founder of it was an American, Mr. Leigh Hunt, who went on a holiday tour to Egypt shortly after the Anglo-Egyptian Government had been established there. He went to Khartoum, and ascended the Nile as far as the Southern Soudan, and on his return he made a proposal to the Governor-General to take up 10,000 acres, with a claim to 40,000 in the future, for immediate cultivation as a cotton plantation. The plot he selected was at Zeidab. Supported by British capitalists in London, Mr. Hunt, aided by an able young Englishman, Mr. Neville, set to work to clear the ground and prepare it for cotton, and they very soon proved the practicability of growing cotton of an excellent quality, and to a profit.

A little over three years ago Mr. Hunt and Mr. Neville retired from the syndicate, and the present managing director, Mr. D. P. McGillivray, took over Mr. Hunt's shares and rapidly developed the plantation to complete success.

Sir William Mather then describes the system and results of the cultivation of the estate, of which the leading features are:—Of the total area of the concession, at present about 12,000 acres, there are now 3,000 acres under cotton, 3,000 under wheat, and over 2,500 under leguminous crops. The land is apportioned, in plots of various sizes, but generally of 30 acres each, amongst 234 tenants, of whom 24 are Greeks, 60 Upper Egyptians, 18 Dongolawis, 100 natives, 2 Syrians, and 1 English. All of them have to conform to the rule that one-third of their land must be under cotton annually, one-third under wheat, and one-third under leguminous crops, or ploughed up and left fallow.

When a tenant takes up new land, he clears it of roots and trees, at a price agreed upon, for which he is well paid. This done, he is given the loan of oxen and implements to level the land, or, if it is very heavy, it is first dealt with by the steam engines and special levelling machines owned by the company.

When the land has been levelled and the tenant is ready to start cultivation, he receives advances from the company every fortnight, calculated on the amount and quality of the work he has done. No interest is charged on these advances, as it is the settled policy of the company to create a feeling of prosperity amongst the tenants. This can only be achieved by allowing them every opportunity to make profits, which encourages them to work hard, and so become valuable assets to the plantation. The proof of the wisdom of this plan is, that all the tenants who have made profits one year not only remain tenants the next year, but also finance themselves out of their profits. They are further encouraged by the offer of a prize of £5 every year to the tenant who can show the largest yield of cotton per acre. The whole plantation is irrigated by a main and subsidiary canals. The company has its own ginning factory, which contains ten gins and a 250-ton baling press.

THE COST OF COTTON-GROWING.

The actual area under cotton in 1909 was 720 acres, the average yield of which was 400 lb. of lint, or about 1,300 lb. of seed cotton per acre; but there were some large areas, which had been specially well cultivated, which produced as much as 700 lb. of lint per acre. The whole crop was sold at from 6s. to 8s. more than the price then obtainable for "fully good fair" on the Alexandria market, whilst the seed fetched £1 per ardeb (266 lb.). At these prices the approximate average return per acre of the crop was:—

400 lb. lint at £6 per 100 lb.	£24 0 0
920 lb. seed, at £1 per 266 lb.	3 10 0
	£27 10 0

It was here stated that the area under cotton in 1910 was 3,270 acres; and, as the prospects of the crop were pronounced by experts to be extremely good, the company confidently expected a proportionately enhanced profit both for themselves and for their tenants. Under these improved circumstances the results looked for would be as follows:—

An average tenant, cultivating 10 acres, should produce a crop of 4,500 lb. of lint and 9,000 lb. of seed. The cost of ginning and baling this quantity would be £7, and the freight to Alexandria £17, making a total cost of £24. Taking the average net price of cotton at Alexandria in 1909 at 1s. per lb., the above crop from 10 acres would realise £225 for cotton and £30 for seed—a total of £255. Adding to the abovenamed costs of ginning, baling, and freights, which amounted to £24—a sum of £40 for rent (or £4 per acre, whereas similar land in Egypt is rented at £12 per acre), and £30 for cultivation and picking, thus bringing the total costs to £94, we find that the difference between the receipts (£255) and the expenditure (£94) is £161, which represents the tenant's net profits on the cultivation of this land (£16 2s. per acre).

In this dry belt of the Soudan, from Sennar on the Blue Nile to Berber, there are absolutely no pests—no such things as "boll worms," "cotton stainer," "cotton weevil," &c., &c.; whilst grass and weeds are practically nil.

The whole cultivatable land of Egypt proper is only 12,000 square miles. Given sufficient capital for irrigation works, there is an area estimated at between three and four millions of acres on the great plain known as Gezira, enclosed on the east and west by the converging course of the Blue and White Nile till they reach their confluence at Khartoum, and it extends 150 miles southward. This land will produce as much cotton per acre and of as good quality as the Delta of Egypt.

Sir William Mather said, in conclusion, that the future of the Soudan's development depends on cotton.

BEEET SUGAR IN NEW ZEALAND.

It does not necessarily follow that, because conditions of soil and climate are favourable for the production of certain crops, the raising of such crops must prove financially successful. Many other factors have to be reckoned with which may operate in the direction of failure. Take, for instance, the cultivation of Ramie or China Grass, which some time ago was advocated by some enthusiasts as a money-making crop for the farmer: the conditions for ramie-growing in parts of Queensland are more favourable than those obtaining in China, but one factor alone is sufficient to deter anyone from planting ramie. That factor is, the want

of a perfect machine for decorticating the raw material. All the ramie fibre exported from China—and the quantity is very considerable—is prepared by hand labour. The prices for the fibre at present range from £31 to £46 for finest samples; but, even if the extreme price were obtainable, still, under our labour conditions, the production of ramie fibre would not fail to result in loss to the producer.

How does the matter stand with the production of beet sugar?

From what we learn of this proposed industry in New Zealand, the prospects are not very bright. On this topic "Dalgety's Review" says:—

"For a great many years past the establishment of the sugar-beet industry has been the subject of agitations and deputations and newspaper articles, but up to the present the industry has not materialised. The Waikato district appears to be well suited for growing the sugar-beet, and experiments made in the production of the beet have resulted rather favourably. The venture, however, has failed to attract capital, and we may therefore assume that there are adverse features which militate against it being a commercial success. One enthusiast explains that the capital required to establish the industry is so large, and so much technical knowledge is involved, that there is very little hope of the industry being established in New Zealand, except the State is prepared in some way to encourage its establishment—say, by offering a bonus for a number of years on the quantity of sugar produced. There are quite a number of other difficulties. The sugar mill would be dependent upon local production entirely, and if the farmers curtailed their areas, or the season happened to be a bad one, there would be heavy loss. Furthermore, it is possible, if not probable, that the growers would raise their prices for beet after a year or two, knowing that the mill must buy or suspend operations. Then, again, there is the question of labour, and the never-ending demands for increased wages and shorter hours. There are great drawbacks apparent when one considers the matter in all its bearings. However, Mr. G. S. Dyer, a Californian expert, is now in New Zealand, and efforts are being made to induce him to inspect the country and report."

It is hoped that in Victoria the beet sugar industry will be profitably revived at Maffra, but the labour question comes in there as well as in New Zealand.

THE OUTLOOK FOR NEW ZEALAND FLAX.

The hemp industry in New Zealand has seen some remarkable fluctuations during the past fifty years, and, judging by an article on the subject published in "Dalgety's Review," it would appear that the outlook for both growers and millers is not a very bright one. Several attempts have been made to induce Queensland farmers to grow New Zealand flax, and seed has been brought over from that country for distribution to any farmer willing to give it a trial, but none have been found willing to exchange the certain profits of dairying, sugar-growing, of wheat and fruit-growing, for the doubtful returns from flax-growing. The "Review" says:—

"Hemp milling engaged the attention of the earliest New Zealand settlers, and for a long time machinery of a very primitive character has been used. Booms and slumps have followed one another in quick succession. About four or five years ago the London quotation for New Zealand hemp reached the high level of £38 per ton c.i.f. This altitude was reached after a steady upward movement from about £20 per ton. When the price reached about £30, it was recognised that the hemp

industry was enjoying unprecedentedly prosperous times. Millers were simply coining money, and this tempted a good many people to intrude for a cut at the profits. The owners of flax areas soon realised that it was time to raise the royalties, and the workers were not slow to take advantage of the situation. The costs of production were materially increased, and the big profits were speedily cut down.

"There is now a great slump, and best grade New Zealand hemp is only worth £19 15s. per ton in London. The industry is in a parlous state, and the millers, especially in the Manawatu district, have had a sad experience this season. Not only is the price of the product low, but the conditions of the industry have been made worse by the vagaries of nature. Owing to the mild season, disease has made its appearance in a number of localities, thereby providing a leaf of no value but for the production of a low-grade hemp. Then the nature of the season has induced a general seeding of the plant, and an unusual production of flower stalks in general.

"New Zealand hemp is suffering from the competition of other fibres, but especially Manila and Sisal; and it is now beginning to be recognised that, if the industry is to be maintained in New Zealand, the cost of production must be very greatly reduced. Closer supervision, more efficient labour, and improved machinery can accomplish much; but there are other considerations, such, for instance, as an adequate supply of the raw material at a cheap rate. Several improvements in machinery have been effected, all tending to reduce the cost of labour and improve the quality of the fibre. Millers who own their own flax areas are able to run their mills without loss, but it is not to be supposed that they will be content to do that very long. Should the price of hemp fall a little more, it is quite certain that operations will cease practically throughout the country, and the owners of flax land will no doubt then see to the utilisation of the land in other ways.

"It is probable, therefore, that large areas of such lands will be drained and converted into pastures, and the milling of hemp will in the future be made more expensive through the scarcity of the raw material."

POTATO DIGGER AT THE QUEENSLAND AGRICULTURAL COLLEGE.

For some years past Queensland inventors of labour-saving machinery have been trying to produce a satisfactory machine. The only two prominently brought forward were those produced first by Mr. Daniels and later by Mr. Jackson, of Taringa. Both were given public trials, and Mr. Jackson's machine appeared to do all that was required of it. Yet neither has been placed on the market, and we have not heard of either being used on Queensland farms. When Mr. J. Mahon, Principal of the Queensland Agricultural College, was in England, he saw a potato digger at work, and decided on importing one. Concerning it, he says:—

"I have to inform you that the potato digger imported from England by me is known as the Martin Potato Digger. I witnessed this machine at work in England, Scotland, Ireland, Guernsey, Jersey, France, and Germany. In all these places the machine has given thorough satisfaction. I have worked it at the College, and found that it does the work in a most satisfactory manner. I have tested it in both wet and dry soils, with good results in each case. I can strongly recommend the machine. 'Martin and Co., Samford, England,' is the address of the manufacturers. The draught is light, and two small horses can work the machine in any class of soil."

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Plate XXVI.



PCTATO DIGGER AT THE QUEENSLAND AGRICULTURAL COLLEGE

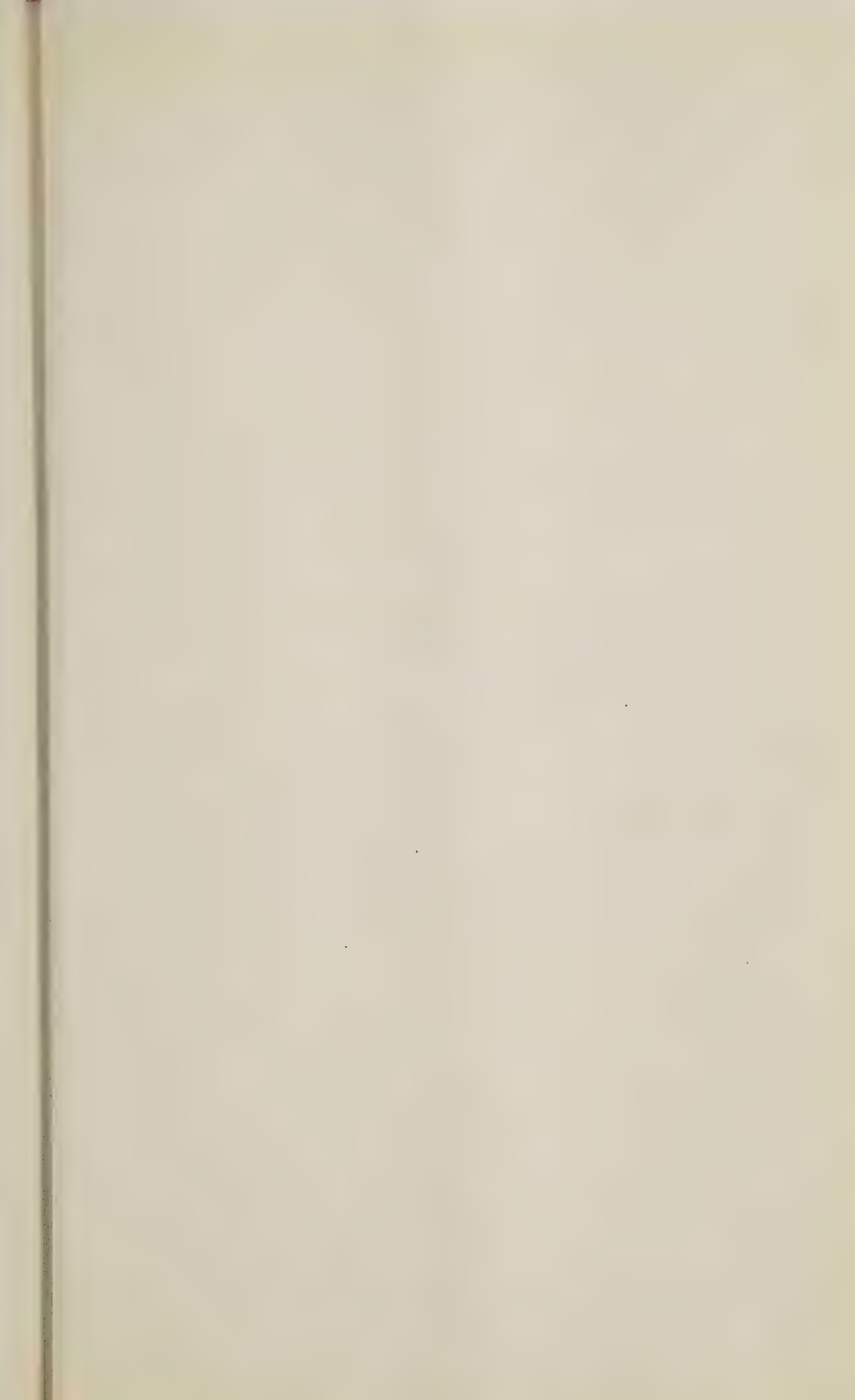


Plate XXVII.



SWATH TURNER AND HAY COLLECTOR AT THE QUEENSLAND AGRICULTURAL COLLEGE.

WHAT PIG-WEED TAKES FROM THE SOIL.

In an article on weeds in the field and the necessity for their destruction, "Garden and Field" particularly points out the loss of plant constituents resultant upon an exuberant growth of pig-weed, and says:—

After careful chemical investigation, it has been ascertained that a ton of this weed, dried in the air, contains five times as much potash, twice as much nitrogen, and an equivalent amount of phosphoric acid as a ton of manure.

"Ponder a moment the extra money we might have in our pockets, or the more up-to-date machinery on our farms, if this energy were stored up in grain, grass and root crops, instead of in weeds. Further, this ton of pig-weed contains as much potash as 75 bushels of wheat, as much nitrogen as 20 bushels, and as much phosphoric acid as 15 bushels.

"When we consider the astounding prolificacy of weeds, in addition to their other ruinous extravagances, the problem they present assumes even more alarming proportions. For example, a single plant of pig-weed produces 150,000 to 800,000 seeds; so that its importance in agricultural economy can, perhaps, be readily appreciated.

"The necessity of an abundance of water for the proper development of plants throughout their entire growing period is appreciated by all; yet here again the loss entailed by weeds is strikingly illustrated.

"For every 1 lb. of increase in the dry substance of plants about 300 lb. of water is transpired, which in a dry summer constitutes a serious waste.

"Further illustrations are unnecessary and enough has already been said to show the necessity of stubbornly attacking 'weeds,' and the importance of co-operation among neighbouring farmers. Usually, the more intensive the farming, the more completely are these pests held in subjection."

SWATH TURNER AND HAY COLLECTOR.

Blackstone's new patent swath turner and hay collector is another useful implement imported by Mr. Mahon for use at the College. Of this machine he speaks very highly and he says it is to be found in use on almost every farm in England. The price is £16 in England.

This machine consists of two turning devices carried in front of the road wheels so that the work done is in full view of the driver, who can fully control them by hand or foot. The direction of rotation of these devices can be instantly reversed by the driver, so that the machine can follow a mower having a right or left hand cut, and can work with the wind always in its favour. In many crops of laid grass a mower can only cut one way—in this case the reversibility of the Blackstone machine enables it to be used in either direction without loss of time—but an irreversible machine would have to travel one way idle. Makers of irreversible machines have to make right-hand as well as left-hand swath turners—because to work properly they should follow the mower, turning the butt end of the swath. The inconvenience of this is that if a farmer has a right and a left hand mower he needs two swath turners. Blackstone's swath turner may be instantly reversed to follow either, and it may be rapidly expanded or contracted to suit any width of cut.

The tines of the Blackstone machine are *not rigidly held*, but are each free to follow inequalities of surface, working as well on the steepest ridge and rein as on the flat.

When the machine is travelling forward the tines get *under* the swath and lift it from the ground, and by a lateral motion *carry* it to the side, where it is feathered or turned completely over and left on a dry track in an open and light condition for curing.

The driver can by means of the reversing levers instantly set the machine to collect two or three rows into one row in one operation, and by means of the expanding axle can collect four rows into one row in two operations.

This machine collects into rows when driven across the swaths, and it will collect or windrow a strewn crop.

All these operations of swath turning and windrowing are instantly done without any structural alteration.

Every swath turning or windrowing process by the Blackstone machine hastens the curing of the crop, and has no tendency to wrap or wind the rows of hay.

It is easy work for a cob turning $2\frac{1}{2}$ to 3 acres in an hour.

The shafts are the only weight on the horse's back. Its extreme width when at work is but 6 ft. 4 in.

DRY FARMING.

At the recent Conference in Adelaide on Dry Farming, at which Mr. W. Soutter, Manager of the State Farm, Roma, read the very interesting paper on the subject published in our April issue, Mr. H. C. L. Anderson, who also read a paper at the Conference, said that he would call all those parts of New South Wales dry which have a less elevation than 1,500 feet, and where the rainfall is less than 25 inches per annum. "But," he said, "science is abolishing some old deserts. In South Australia there is on the old maps a tract known as 'the 90-mile desert,' which is now used for farming and stock-raising. Fifty years ago one-third part of the United States was called desert; now within that area there are over 10,000,000 people living in comfort, and 30,000,000 cattle are grazing. In Utah fair farming is done on a 13-inch rainfall by alternate cropping and summer tillage; in other States 20 in. give best results with annual cropping and special cultivation. Our dairy farmers on the North Coast, who enjoy a rainfall ranging from 50 to 120 in., more often complain of drought than the wheat farmers. A six weeks' dry spell is a drought to them, because they depend almost entirely on pasture, they plough little, and take no steps to conserve soil-moisture.

"The general lesson apparently to be learnt from the United States, supported by our own comparatively short experience, is that the country of even rainfall with winter falls and low evaporation, absorptive basaltic soils not too fine nor too coarse can produce wheat with 10 in. and even $8\frac{1}{2}$ in. of rain. A glance at the rainfall map of the United States shows that Australia is comparatively much better off than most people imagine. The experience of Utah shows that a payable crop was generally got when the rainfall exceeded 13 in., with only 4 in. in the growing period, and evaporation only 42.

"In Idaho, with an average of 10.32 in., the first attempts fifty years ago resulted in heart-breaking failures; but on the introduction of better methods, the recurrence of more abundant rainfall, districts once deserted are once more populated, and farming—so it is asserted—has been placed on a permanent basis."

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE,
GATTON.

RECORD OF COWS FOR MONTH OF MARCH, 1911.

Cow.	Milk.	Test.	Butter.	At per lb.	Value.
	Lb.		Lb.		£ s. d.
AYRSHIRES.					
Lady Margaret ...	807	4.5	40.82	10d.	1 14 0
Levida ...	928	3.7	37.35	"	1 11 1
Linda ...	1,008	3.3	36.76	"	1 10 8
Lass ...	639	5.0	36.13	"	1 10 1
Lavinia's Pride ...	535	5.5	36.08	"	1 10 1
Lark ...	725	4.4	35.80	"	1 9 10
Lady Lock ...	737	3.9	32.07	"	1 6 9
Laura ...	803	3.3	29.27	"	1 4 5
Helen ...	607	3.9	26.41	"	1 2 0
Conceit ...	551	4.1	25.27	"	1 1 1
Ten cows ...	7,240	41.6	335.96	"	14 0 0
Average ...	724	4.1	33.59	"	1 8 0
SHORTHORNS.					
Butter ...	560	6.8	44.74	10d.	1 17 3
Grace ...	668	5.1	38.49	"	1 12 1
Glen ...	581	5.3	36.17	"	1 10 1
Honeycomb ...	574	5.3	34.42	"	1 8 8
Nellie II. ...	810	3.7	33.35	"	1 7 10
Miss Hayden ...	706	3.9	30.73	"	1 5 7
Dot ...	621	4.4	30.64	"	1 5 6
Red Rose ...	773	3.7	29.82	"	1 4 10
Lady Kelso ...	750	3.5	29.11	"	1 4 3
No. 6 ...	836	3.0	27.52	"	1 2 11
Gem ...	744	3.1	25.37	"	1 1 2
Burton's Maid ...	753	3.0	24.78	"	1 0 8
Twelve cows ...	8,376	50.8	385.14	"	16 0 10
Average ...	698	4.2	32.09	"	1 6 9
JERSEYS.					
Careless ...	703	5.9	49.07	10d.	2 0 11
Carry ...	729	3.6	29.16	"	1 4 4
Bee ...	606	3.6	24.24	"	1 0 2
Three cows ...	2,043	13.1	102.47	"	4 5 5
Average ...	681	4.3	34.15	"	1 8 5
HOLSTEINS.					
Daisy ...	502	4.4	24.79	10d.	1 0 8
Lady Sue ...	572	3.7	23.54	"	0 19 7
Dewdrop ...	681	2.9	23.19	"	0 19 4
Miss Melba ...	547	3.5	21.23	"	0 17 8
Four cows ...	2,302	14.5	92.75	"	3 17 3
Average ...	575	3.6	23.18	"	0 19 3

GRADES.

Cow.	Breed.	Milk (lb.)	Test.	Butter (lb.)	At per lb.	Value.
						£ s. d.
Mona ...	Holstein-Shorthorn	693	4.9	48.30	10d.	2 0 3
Peewee ...	" "	496	4.8	26.83	"	1 2 4
Ethel ...	" "	461	5.0	26.01	"	1 1 8
Three Cows	...	1,650	14.7	101.14	"	4 4 3
Average ...	...	550	4.9	33.71	"	1 8 1
Graceful ...	Guernsey-Shorthorn	718	4.4	35.47	10d.	1 9 7
Orange ...	" "	631	4.9	34.87	"	1 9 1
Nancy ...	" "	613	4.1	28.10	"	1 3 5
Lemonade ...	" "	449	4.0	20.07	"	0 16 9
Four Cows	...	2,411	17.4	128.51	"	4 18 10
Average ...	...	602	4.3	32.12	"	1 4 8
Comet ...	Grade-Holstein	752	4.1	34.49	10d.	1 8 9
Hettie ...	Ayrshire-Shorthorn	527	5.4	32.83	"	1 7 4
Lalla ...	Ayrshire-Holstein	539	4.0	23.09	"	0 19 3
Nira ...	Guernsey-Shorthorn	458	3.2	16.15	"	0 13 6
Four Cows	Grades	2,276	16.7	106.56	"	4 8 10
Average ...	Grades	569	4.1	26.64	"	1 2 2

AVERAGE FOR MARCH, 1911, FOR FORTY COWS.

Breed of Cow.	Milk (lb.)	Test.	Butter (lb.)	At per lb.	Value.
					£ s. d.
Ayrshires (10) ...	724	4.1	33.59	10d.	1 8 0
Shorthorns (12) ...	698	4.2	32.09	"	1 6 9
Jersey (3) ...	681	4.3	34.15	"	1 8 5
Holsteins (4) ...	575	3.6	23.18	"	0 19 3
Grades (11) ...	573	4.4	30.15	"	1 5 0
Five Breeds	3,251	20.6	153.16	"	6 7 5
Average ...	650	4.1	30.63	"	1 5 6

THE LINCOLNSHIRE RED SHORTHORN BREED OF CATTLE.

Before the year 1895 the Lincoln Reds, as the Lincolnshire Red Shorthorns are popularly called, were little known beyond their native boundaries, although Lincolnshire had long ago earned the proud title of premier agricultural county in England. It was in that year that the Lincolnshire Red Shorthorn Association was formed to promote the interests of this variety of the great Shorthorn race, by publishing a register, and securing uniformity of type and colour. There were (in 1909) 320 members of the association, and 741 bulls and 663 cows and heifers were entered in the 15th volume of the herd book; the number of bulls entered now being 6,526. But it was not till the year 1901, when

the Royal Agricultural Society of England first granted them special breed classes at their exhibition at Cardiff, that the cattle really began to attract attention, and the comments of the ring side, both from foreign buyers and home breeders, were distinctly favourable; the general opinion was that they were bred on Shorthorn lines to a well-defined type and colour, showed great evenness of flesh, and were possessed of undeniable "milking" qualities. Since then there has been a steady advance both in the appearance and the popularity of the cattle. There has been no "booming," no sensational prices, and no flourish of trumpets; but the cattle have been making their worth known by the best of all possible tests—practical experience. For many years their admirers had claimed the Lincoln Reds to be the ideal tenant farmers' cattle, hardy and thrifty, and with the soundest of constitutions; that they were economical feeders, and animals that came quickly to maturity; a race of beef and milk producers; and, in fact, the real rent-payers. But of late years the lessons of the show ring have resulted in greater Shorthorn neatness, better backs, and shorter legs; and this without losing the qualities that make them so valuable, not only to the men of Lincolnshire, but to a rapidly increasing number of tenant farmers in all parts of England, in the dairying countries of Europe, and in South America, Australasia, and South Africa. It is claimed by the admirers of the breed that the cattle are the ideal tenant farmers' cattle, and their history shows that the boast is no idle one. Wintered in fold yards, with little or no shelter; fed on barley straw and a few turnips; exposed to the coldest of winds and the wettest of weather, the weakest have been weeded out with most marvellous certainty. About the middle of April they are turned out to get their own living, facing the biting east winds from the North Sea, and if there is any delicacy in cow or calf it is soon discovered. During the hot months of summer there is often little drink but such as is provided by stagnant ponds. This is the case that has been going on in the case of the Lincoln Reds for 100 years or more. And the result? distinctly a case of the survival of the fittest; a race of cattle that not only do not lose their condition under circumstances that would have had the most disastrous results as regards most breeds, but thrive and grow on and improve, laying on a wealth of lean flesh and providing a bountiful supply of rich milk for the nourishing of their offspring. This is a state of things that tenant farmers all over England and in the colonies should take notice of—this ability to grow and develop where most breeds would pine and shrink, and to bring up two or more calves besides their own. At two and a half years old the grass-fed steers may be looked upon to yield from 8 to 10 cwt. of the best meat, and stall-fed cattle up to 24 cwt.; and the butchers say they cut up a far greater proportion of lean flesh, with very much less offal, than any other breed they know. By judicious selection and proper treatment the milking capabilities of the breed may easily be developed, as has been proved by Mr. John Evens's wonderful successes in the chief milking trials in England and Ireland, where he has demonstrated the superiority of the Lincoln Reds over all other breeds. The reputation of the breed as an ideal dual-purpose cattle is thus fully established; for no other breed can boast such beef-producing steers and at the same time such milk-producing females. From the above description we see that their chief characteristics are—

- (1) Hardiness, because they are naturally reared by tenant farmers who make them "rough it" in a changeable climate, and they are not in-bred.
- (2) Whole red colour.

- (3) Early maturity, producing young bullocks of first-class quality.
- (4) When bred for milk they have proved that they can hold their own for quantity and quality in any company.

On one side of the county at home, little notice is taking of milk-producing. The animals are thick, square, short-legged, hardy animals, well suited for beef and ranching purposes.

It is Mr. Evens who has demonstrated to the world, by means of his wonderful successes in milking trials and butter tests in England and Ireland, the great dairy properties the Lincoln Reds are capable of when they are specially bred for it. Animals from this herd have won—

All the principal trials in England, including two challenge cups, 4 champion cups, 24 medals, and 61 prizes at the London Dairy Show.

Bath and West of England: 1st milking, three years in succession; 1st in three days' butter test.

Dublin: 1st and challenge cup four years in succession.

Belfast: 1st and challenge cup three years in succession.

Tring: The largest trials in England, 4 firsts and 3 seconds in last eight years. Here Burton Margaret holds the record for producing the greatest quantity of milk and butter in a day.

At the Royal Show of England this year Burton Fuchsia III. gave in 24 hours 77 lb. 12 oz. milk, containing 45 per cent. fat which churned into 3 lb. 12½ oz. butter. This constitutes a "record" for any pure-bred cow in England.

There are to-day in the Burton herd 40 cows and heifers which have won in public show yards and milking trials.

Probably no herd has produced such successful sires in recent years as has the Scampton herd belonging to Mr. G. E. Sanders, much of the success of this herd being due to Keddington Ruby (1243), whose sons have made more money at the association's sales at Lincoln than have those of any other breeder. On ten occasions in twenty years Mr. Sanders has secured the highest individual price, and on thirteen occasions has he had the highest average. To him belongs the honour of the record price for a Lincoln Red—that of 305 guineas—which was paid by Mr. Cockbain for Scampton Jodreef (4569), a bull destined for Chile.—"Rhodesian Agriculture Journal."

ANGORA GOATS AND PRODUCTION OF MOHAIR.

There are two items of production (says "Dalgety's Review" for March) in which South African farmers and graziers tower over Australians, although the growing conditions of the two countries are very similar—one is in mohair, and the other is in ostrich feathers. Both products are of considerable value; they are world-market commodities, as much as wheat or wool, and are profitable where carried on in suitable situations.

With ostriches we are not herein concerned; for they do not appeal to graziers with half the force that Angoras do. The Angora goat can either be put on to land to prepare it for sheep, or it can be grazed for mohair in arid situations where sheep might not thrive. In the common goat you merely have a goat of value for a little milk in the doe and

the value of the skin in the buck—goat's milk and goat skins, with much annoyance, sum them up. With the Angora it is quite another matter; they are essentially a mohair-producing animal, growing a lustrous fleece of considerable value. Angoras improve moderate grazing land, and, if raised in large numbers like sheep, there is no reason why Angora mutton should not become as common an article of diet as crossbred or merino mutton.

At present the mohair-growing industry is in its infancy, and yet already this season Dalgety and Company, Limited, have shipped upwards of 3 tons of mohair to London on various growers' accounts; while, as agents for Messrs. Blaxland and Knox, Wyalong, they have also exported a number of purebred Angora rams to various parts of the Commonwealth and Dominion.

Here follow particulars of prices realised for five bales of mohair from returns recently received. The mohair was shipped by Dalgety and Company, Limited, Sydney, and sold by their London house in November last:—

A/c Messrs. Donaldson and Glissan, Rockhampton (Q.), 2 at 12½d. and 12d. per lb.

A/c Mr. A. C. Lock, Rockhampton (Q.), 1 bale at 11½d. per lb.

A/c Messrs. Wilson and Symons, Selma (Q.), 1 bale at 8½d. per lb.

A/c Mr. J. Attenborough, Marulan (N.S.W.), 1 bale at 12½d. per lb.

With regard to the shipment of Angora rams made recently, the following particulars should be of interest; they were from Messrs. Blaxland and Knox's Wyalong flock, and were shipped as follows:—

On February 4 last—Four pure-bred stud Angora rams to Rockhampton, three of which were consigned for Barcaldine (Q.) Municipal Council, and one special stud ram for Messrs. Scott and Sons, Banana (Q.).

On February 11 last—Two stud Angora rams for New Zealand, consigned to Messrs. Taylor and White, Hawkes Bay (N.Z.).

A London market report, dated 5th January last, gives some idea of the mohair position, and is as follows:—

“During the past week the market in Bradford has remained to some extent under the influence of the holidays, and very little business has been passing in the raw material, so that no very distinct indication with regard to the future has been shown. At the same time, the general tendency appears to be satisfactory. The outlook for the mohair trade is considered to be healthy, and the position of the market sound, with every prospect of the maintenance of about the present level of prices for most classes. The stronger qualities of firsts, however, still form the exception, and, although these seem to be relatively cheap, there is very little demand for them, and the consumption continues restricted.”

A report for the year ending 31st December last reads as follows:—

“The mohair trade has also been a large one, and the leading feature has been great steadiness of prices, together with a record consumption. Fine mohair has been the leading article consumed, and great strides have been made by many firms by way of putting down more machinery, the only difficulty experienced being a scarcity of hands and an output large enough to meet the demands of customers. Turkey mohair has been the most favoured article. Many complaints have been heard as to the increasing coarseness in quality of South African mohair.”

CATTLE BORN EARMARKED.

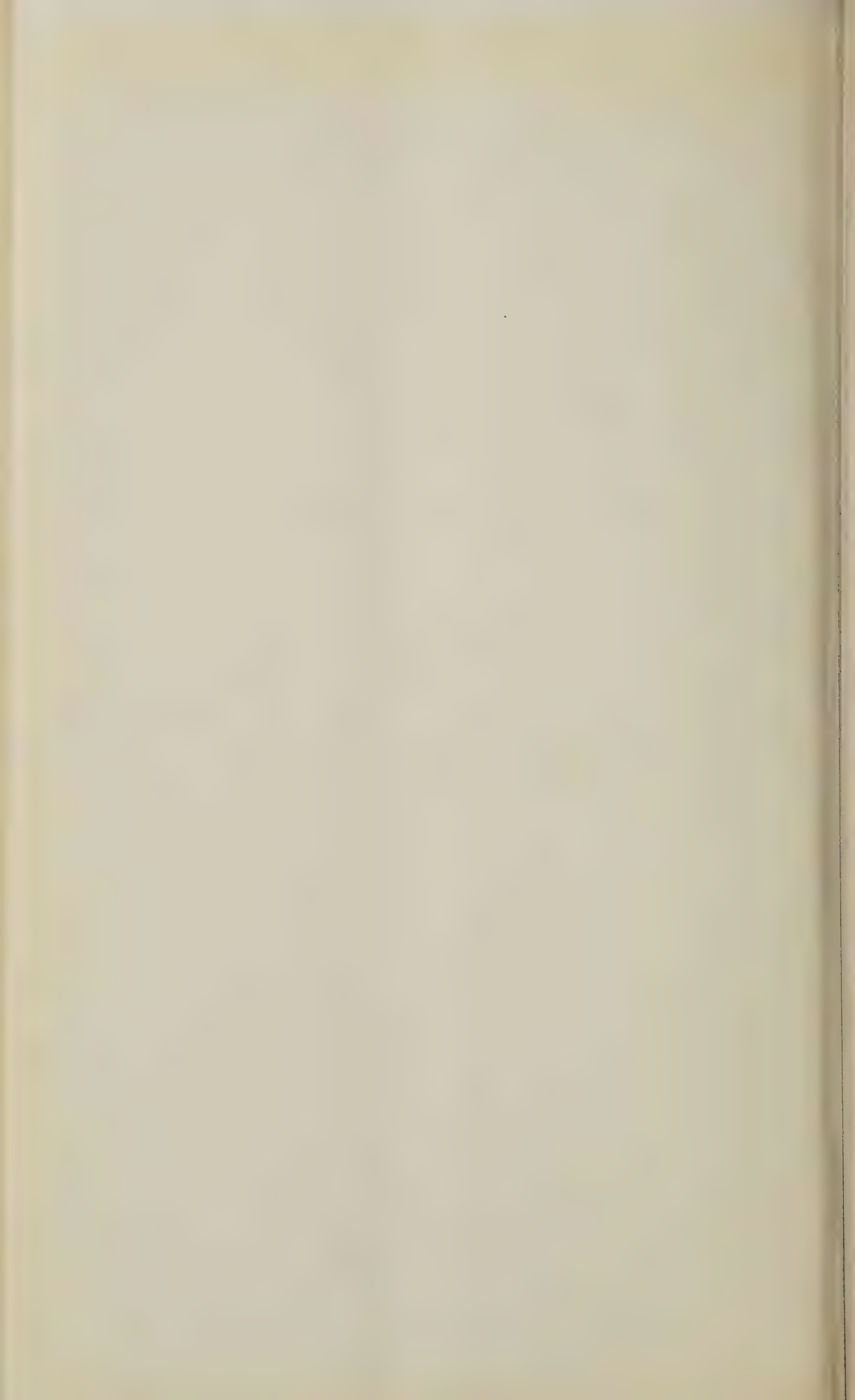
The "Live Stock Journal" says that Dr. Wilmot, M.R.C.V.S., Government Veterinary Surgeon of Tasmania, who is conducting laboratory investigations at Campbell Town in regard to some obscure disease of stock, reports a strange freak in breeding. He says:—"The following is an authentic curious fact which is well worth making public. Mr. Clarke, of Quorn Hall, bought a cow some time ago, branded with swallowtail earmarkings in both ears. She was a half-bred Alderney. The cow had three calves (one every year), and each calf was born with swallowtail earmarks in both ears. The first of the three calves, a heifer, grew up, has now a calf to a Hereford bull, and this calf has also swallowtail earmarks in both ears. This proves how an artificially acquired abnormality may be continued for at least three generations, and probably permanently—a question about the possibility of which breeders and others differ. It should be of interest in connection with the subject of dehorning cattle, as it opens up a large question of the possible heredity of acquired abnormalities." Mr. R. W. Dawson, inspector of stock, had an experience of a cow having several calves born earmarked as she was, and coincidentally the mark was a "swallowtail" in one ear. Another case that came under his notice was that of a pure-bred Shorthorn bull, purchased many years ago from the Maharatta herd. He bore a pliers earmark (stud mark), and he sired a percentage of calves which were born earmarked as he was. It was a red bull, and the more remarkable occurrence was that the red calves only were so marked.

Referring to the above, "Breeder" writes to the "Live Stock Journal" as follows:—"Seeing the account of cattle born earmarked in last week's 'Live Stock Journal,' it would be interesting to know if the original cow was proved to be artificially earmarked. Experience points to the fact that mutilations are not reproduced, or hackney foals and fox-terriers, &c., would be born with short tails. When at an agricultural show at Lerwick, Shetland, some years ago, I was struck by the large number of earmarked Shetland cattle, and asked a native of the island why it was the fashion to so disfigure them (the marks varied from a nick out of the points to, in some cases, both ears half off, apparently cut square in the clumsiest way). He replied he had never heard of such a thing being done, but that it was quite common for animals of this breed to be born with notched ears. I afterwards proved the truth of this when owning a few Shetland cows. More than one was earmarked, and their calves were born with pronounced V-shaped nicks in the point of each ear. I have since heard this peculiarity is not uncommon among West Highland cattle, and goes by the name of 'Palmer's lug mark.' "

SWINE HUSBANDRY.

We have received, through the Under Secretary, Department of Agriculture and Stock, copy of a lecture delivered at the Farmers' Club, London, by London M. Douglas, F.A.S.E., on the subject of swine husbandry, which has recently attracted universal attention.

The introductory part of the lecture dealt mainly with statistics showing that the average number of pigs in the United Kingdom amounts to 4,000,000. The reasons for high prices and scarcity of pigs during the past two years were stated to be the universal scarcity in other countries, notably in the United States of America, owing to the rapid increase of population; and the lecturer said that it might be anticipated that, in a few years' time, the United States will begin to



buy instead of being in a position to sell such products. The imports and values of the imports of pig products into the United Kingdom in 1910 were shown to have decreased from 7,181,577 cwt. in 1908 to 4,809,706 cwt. in 1910, the respective money value being £17,894,099 and £16,222,027.

Not the least interesting part of swine husbandry is the history which was given of the various breeds which are now recognised in the United Kingdom. These were stated to be:—The Large White Yorkshire, the Middle White Yorkshire, the Tamworth, the Berkshire, the Large Black Pig, and the Lincolnshire Curly-coated Pig. These breeds are now finally fixed in the United Kingdom, and were each described by the lecturer. In the United States the principal breeds are the Poland-China, the Chester White, and the Duroc-Jersey—all modifications of British importations in years gone past. The ancient and modern practices of pig-breeding were then dealt with, as well as the feeding, mating, and breeding of pigs. The lecture was illustrated by a large number of lantern slides showing the various breeds of pigs, method of housing and storing, veterinary inspection of pork in Holland, &c. Models and specimens illustrating pigs in their wild state were also exhibited. A lengthy discussion ensued, and the paper was keenly criticised. Mr. Sanders Spencer declared it was one of the best papers, from an historical, statistical, and scientific point of view, he had ever read in connection with swine husbandry.

TON AND A-HALF OF MILK IN A MONTH.

The "Farm Press," a monthly agricultural journal published at Chicago, says that New York State holds the honour of producing the best cow the world has ever known.

The name of this queen of all cows is DeKol Queen La Polka 2d. Her owner bought her for £35. The record is as follows:—

Butter record, seven days, 35.34 lb.

Butter record, thirty days, 145.10 lb.

Milk record, one day, 124.00 lb.

Milk record, eight days, 841.8 lb.

Milk record, thirty days, 3376.9 lb.

Just reflect a moment what this means—more than 11½ ton of milk from one cow in 30 days. It amounts to a small fraction over 378 gallons of milk for the 30 days.

There is only one cow in the world that has ever beaten any of the above records. She made 35.55 lb. of butter in seven days. Her owner was offered just £1,600 for this cow right after the test was made, and in two weeks from that day the animal was dead, having contracted pneumonia.

The cow that has tested nearest to DeKol Queen La Polka 2d. is Colantha 4th's Johanna. Her record is as follows:—

Butter record, seven days, 35.22 lb.

Butter record, thirty days, 138.54 lb.

Butter record, one year, 1248 lb.

Milk record, thirty days, 2677.5 lb.

Mr. Gillett was offered for this cow and her male calf the sum of £3,000, but refused it.

[The prices here stated to have been offered for two cows seem preposterous. Probably dollars should be read for pounds sterling. Even then £320 and £600 for these cows, respectively, is incredible.—Ed. "Q.A.J."]

CHEESE INDUSTRY.

Paper read by E. Graham, Dairy Expert, at a Meeting of the Queensland Cheese Manufacturers' Association, held in Toowoomba on the 14th March, 1911.

For two successive seasons the production of cheese in Queensland has exceeded local and interstate requirements; consequently the attention of manufacturers has been turned to oversea markets, and trade in cheese with Great Britain has been inaugurated to absorb the surplus quantity produced.

The amount of cheese brought forward for export this season shows a material increase over that of last season, the figures showing that, during the export season 1909-1910, there were 3,500 cases of cheese exported, while for the season 1910-1911 over 4,200 cases were tendered for export, representing an increase of over 20 per cent. in favour of the latter period.

The value of this season's cheese exports may be estimated at over £15,000.

It certainly appears as if cheese manufacture is sufficiently developed in this State to establish permanency in oversea trade. Further expansion in this direction will undoubtedly follow, provided the trade can be retained on a remunerative basis.

Great Britain needs cheese, and each year her requirements in this direction are increasing, one cause being increased population, the other being due to the falling off of cheese exports from Canada to Great Britain—Canada now having a nearer market in the United States. At the present moment the success of cheese exportation seems to hinge solely on the quality of the article we have to offer, and on our readiness to conform with the London trade requirements as to maturity, size, colour of the cheese, and style of packing.

Cheese manufacturers must not lose sight of the fact that, immediately production exceeds local requirements and exportation is undertaken, their product is brought into direct competition with the cheese production of other countries, and has for its competitive rivals the finest cheeses made in the world.

Countries that have, for decades past, given their close attention to cheese manufacture, and have studied the requirements of the London market in minutest detail, bring forward their cheese on the oversea market.

Canada and New Zealand have built up a reputation for the good quality of their cheese. Both countries are a considerable distance from Great Britain, and the voyage and other difficulties of marketing are almost as great as those connected with the marketing of Queensland's production.

All that is necessary is, that Queensland milk producers and cheese manufacturers shall take the matter up with the same keen, intelligent interest as those of the above countries, and success will be assured.

Give the London purchasers and consumers an article of undoubtedly good and uniform quality and in other respects agreeing with their trade demands, and there will be no difficulty in securing highest market rates in exchange.

In a nutshell, to propound a scheme for successful cheese exportation necessitates a study of existing London trade customs and ideas.

The buyers in London are most conservative in their ideas, and insist upon exporters supplying an article of the quality and in a form agreeing with their trade demand.

Plate XXIX.



QUEENSLAND CHEESE,

Plate XXX.



NEW ZEALAND CHEESE.

In common with other edible commodities, flavour is of utmost importance in cheese.

The flavour of high-grade cheese is agreeable to the palate, nutty, clean, and devoid of any bitter or objectionable after taste.

Texture.—Perfect texture in cheese is shown when a plug or cut surface of the inside cheese presents to the eye a solid, compact appearance free from breaks or holes.

Body.—This term used in connection with cheese refers to the consistency, firmness, or substance of the cheese. Perfect body in cheese is indicated when it feels solid, firm, and smooth in its consistency.

Colour.—Colour of cheese varies according to the demands of special markets. Both coloured and uncoloured cheese are sought in the London market. There appears to be an increasing demand for uncoloured cheese. When colouring is used, the colouring matter added should be at least 50 per cent. more than is generally used for local market cheese. The colour must be decided, either a good healthy white, or a deep even tint. On each crate it should be plainly stencilled whether the cheeses contained therein are coloured or white.

Size.—The most fashionable size for oversea sale is a cheese weighing from 70 to 80 lb. The dimensions of a matured New Zealand cheese are 15 in. in diameter and 11 in. in height.

Packing.—Two cheeses should be packed in each crate, with a securely nailed partition between them. The crate should be clean and smart in appearance, and the ends of the crate bound with hoop iron or wire to increase its strength. On each end of the case there must be indelibly impressed the full trade description, setting out the name of the manufacturer or his registered brand, the name of the State of origin, and the word "Australia," together with the net weight of the contents. The date of manufacture should also be stencilled on the crate, and cheeses of varying quality or colour should not be packed in the same crate. Should this be done, the result will be that the crate will be marked to agree with the quality of the worst cheese discovered in the crate at the time of inspection.

The London market offers fair inducement to Queensland cheese manufacturers; but, to achieve success, a good deal of attention to details of oversea requirements must be given.

One of the greatest factors operating against success is the lack of uniformity displayed in our consignments. In some instances, the cheeses tendered for export vary in quality, stage of maturity, colour, size, and package. Even the cheeses of individual factories differ in almost all of the above particulars.

Greater uniformity in the consignments is essential, the objective being to make the whole of the exports appear as if they were the produce of a State rather than the individual efforts of different factories.

Cheese intended for export must be specially made for that purpose, as the popular London size of cheese differs from the size favoured by local grocers or interstate purchasers.

It is, in my opinion, detrimental to the interests of trade with Great Britain to attempt to unload on that market cheeses that have been found unsaleable on the local market. In few, if in any, particulars do such cheeses conform with oversea market requirements. Again, the storage of these cheeses in agents' premises in warm atmospheres destroys the likelihood of the quality being found satisfactory in London. To obviate this difficulty, a more systematic way of regulating the quantity of cheese for export to be made by each factory must be devised. Another fault

lies in the temperature for maturing cheese. Apparently some cheese exporters are inclined to the opinion that, to subject a newly-made cheese to high temperatures little affects its quality. This is not so, although the action of high temperatures is more discernible upon older cheese. In the case of newly-made cheese, high temperatures act detrimentally against its subsequent flavour and texture; while to expose partially or fully matured cheese to high temperatures means that the butter fat is melted from the cheese and more than probably a bitterness in flavour is also caused.

Any continuous temperature above 70 degrees Fahr. will cause the butter fat to run from cheese; therefore a maximum maturing temperature is about 65 degrees Fahr. The best results in maturing are to be obtained by holding cheese at a temperature of 50 to 55 degrees Fahr. An even temperature is necessary—not a fluctuating one. To place cheese exportation upon a sound basis, it is apparent that the cheese must be stored in some suitable premises at the factory or in Brisbane, immediately after manufacture, and held there prior to despatch per steamer to Great Britain. At present no suitable convenience for the work exists, but the unanimous effort of all concerned in cheese exportation should be directed towards the speedy construction of efficient premises for such purpose.

In the present issue of the "Agricultural Journal" specimens of New Zealand and Queensland cheese, as made for export, are illustrated.

This has been done to enable cheese manufacturers to see the difference in the dimensions of the two makes.

While there is only a trifling disparity in the weights of the two cheeses, it will be noticed that the circumference of the New Zealand article is greater and the height less than is the case with the Queensland product.

The greater circumference and lesser height of the New Zealand shaped cheeses are features that the manufacturers of this State could, with advantage, graft into their process of manufacture.

The general adoption of a cheese shaped more in agreement with the New Zealand model would materially reduce the difficulty now experienced in keeping the newly-made export cheeses upright on the maturing shelves.

The shape of the export cheese, as at present adopted in this State, is rather too high in proportion to its diameter. The result is that the cheeses are somewhat top-heavy and have a decided tendency to lose their shape on the maturing shelves.

SHEEP CLASSING AND ITS ACCRUING BENEFITS.

By G. A. SIMPSON, Sheep and Wool Expert, Bollon.

At the present time of prosperity, and whilst our flocks are still plentiful, I desire to call the earnest attention of pastoralists to the varied and great benefits to be derived from "sheep classing." Of course, the past good years have been conducive to the increase of all grades of stock, and pastoralists must sooner or later find an outlet for their surplus sheep; therefore they should take the present timely opportunity of reserving their best sheep. Sheep carrying scanty fleeces

of inferior wool, and showing innumerable other defects from a breeder's point of view, should be classed out and disposed of. To breed from them now is folly, and at all times not desirable, whilst to send good breeding ewes to the butcher is like "killing the goose that lays the golden egg," or to sell indiscriminately good, bad, and indifferent sheep when pushed for grass, means throwing away much profit, and many advantages of income, that could have been retained for all time by keeping the best sheep. In every type and breed there are indications that point to truèness or deterioration—there are defects both constitutional and otherwise that have been transmitted from generation to generation: these are the sheep to dispose of. About the end of the big drought our pastoral and financial institutions were much concerned at so many good breeding ewes going to the butchers. If it was desirable to save them then, how much more advisable is it now to class out and derive a lasting benefit from the best sheep we have ?

Why should some of the best sires be wasting their substance on inferior and undesirable ewes who are afflicted with defects of fleece, form, or constitution? By classing his ewes and keeping the best separate a pastoralist can insure the expenditure of his best blood in the best quarter; he saves the waste of a good ram on an inferior ewe; he obtains a bigger increase from his best sheep; and produces an animal worth two inferior ones; his profits are nearly doubled per head. Consequently, he needs only half the grass to sustain that profit, with only half as much in working expenses and attention. It minimises his shearing expenses and does away with one half of his general risks. Then there remains the wether portion of his increase, which are more valuable as wool producers and as butchers' sheep. Then, again, if a pastoralist has his best sheep classed out, he can much better save the foundation of his flock in times of drought. These remarks will apply to all flocks and breeds (always allowing that each flock is a consideration in itself), and I feel sure that the classing of all flocks must result in much good and continuous benefit to pastoralists in particular, and the nation as a whole.

DYNAMITE IN AGRICULTURE.

Probably no stranger use for dynamite has ever been devised than its substitution in place of the plough for the tilling of clay land (says the "Pastoralists' Review"). It is being put to such a use on a considerable experimental scale in Kansas. The first experiment of Spartanburg consisted of the exploding of a stick of dynamite in each of a series of watermelon hills, and the resultant crop showed the benefit of the heroic treatment. The next experiment was the breaking-up of an acre field by dynamite. The cartridges were placed 3 ft. apart in rows, and at a depth of 4 ft. The holes were made by driving crowbars to the desired depth. The dynamite was exploded by a line of men, provided with red-hot irons. The line went rapidly down the field, the explosions following the men in a steady roar that was deafening. The explosion threw clouds of soil 30 ft. into the air, and covered the men from head to foot with dust and dirt. Clay land, when once disturbed to a depth of 4 ft. to 5 ft., is said never to revert to its former solid and impervious condition. One of the great troubles of the southern farmer of America has been to keep the clay from puddling and holding the water on the surface of the soil—a trouble thus removed.

Poultry.

PRESERVING EGGS.

The best method of preserving eggs is, we have found, by the use of what is known as "waterglass," which is chemically called "silicate of soda." We have kept eggs in a solution of waterglass for over six months in a kerosene tin, and they were then as fresh as when laid. The Rev. T. W. Sturges, a well-known English authority on all that concerns poultry, says that he has laid down thousands of eggs in waterglass, beginning in April or May, and they have been as fresh as new-laid ones after the following Christmas, and, indeed, over a full year. A 3-lb. tin of silicate will preserve 300 eggs or more. If the waterglass is of full strength, a 5 per cent. solution is strong enough. One measure of this to nineteen measures of water is about the right strength. Waterglass is about half as heavy again as water, and equals 15 lb. to the gallon, so that 3 lb. of waterglass will make 3 gallons of the solution, which is enough to cover 300 eggs or more. The waterglass should be put into an earthenware vessel, a zinc bucket, or a kerosene tin, and then several measures of very hot or boiling water must be emptied over it so as to make a thin solution. The remaining part of the water should be boiled, and may either be added and stirred together while hot or after it has cooled.

When the liquid is quite cooled, half fill the vessel in which the eggs are to be kept, and place them in; or, if there are enough eggs to fill the vessel, place them in first, and pour the cool mixture over them till they are covered. They should be quite clean when put in, and are better if not more than a day or two old, though they may be added when a week old.

The test of the strength of the waterglass is that, if it is too strong, the egg will float even when quite new laid. This would happen in a 10 per cent. solution, which would be too strong, as the eggs must sink and be covered. Even a solution of 15 parts of water to 1 part of waterglass may be too strong, and the proportion given (1 to 19) is about correct, if the waterglass is of full strength. Eggs may be added from time to time, as they are collected, until the vessel is full. About an inch of water should cover the top layer, and the vessel is best covered over and kept in a cool dark place—a cellar for preference. Care should be taken that no tainted egg is placed in, as it will turn the solution musty and somewhat affect the others. When taken out for use, they should be washed, and when boiling one it should be pricked at the thicker end, or it will crack with the expansion of the contained air, since the waterglass stops up the pores of the shell, by which means the freshness is preserved. As the solution prevents any air getting into the egg, so it prevents any from escaping when the egg is boiled. The boiling water expands the internal air and causes an explosion. Hence the necessity for pricking the big end.

For general cooking purposes they are as good as the best. Still, although they are perfectly fresh, it would be fraudulent to sell them as fresh-laid eggs, and the fraud is easily detected because, besides their cracking when being boiled, the yolk, owing to the egg lying for perhaps months in one position, tends to get closer to the under part of

the shell. It is safer to put down unfertile eggs—i.e., eggs from a pen or yard in which no male bird has been kept. But they are equally good when gathered from a breeding pen, if put down quite fresh, before germination has commenced.

We have been asked if eggs thus preserved will hatch out, but Mr. Sturges says that many attempts have been made to preserve eggs for hatching purposes, but, so far as his experience goes, none have proved successful.

Another method of preserving eggs is by means of a limewater solution. If 4 parts, by measure, of finely slaked lime are mixed with 20 parts of water and 1 part of salt, and the whole well stirred together a few days before using, and the clear liquid be then poured off, and the eggs placed in it, they will keep fresh if well covered with the solution. This is an old-fashioned method, and is not to be compared with the waterglass process.

Statistics.

COMMONWEALTH METEOROLOGY.

RAINFALL OF QUEENSLAND.

TABLE SHOWING THE TOTAL RAINFALL FOR EACH MONTH OF THE YEAR IN THE AGRICULTURAL DISTRICTS OF QUEENSLAND.

STATIONS.	1910.										1911.		
	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
<i>North.</i>													
Bowen	21.45	5.26	0.18	2.23	0.58	0.18	3.75	0.30	3.89	5.36	23.72	7.57	10.66
Cairns	24.16	16.13	3.51	6.59	Nil	3.59	1.34	1.67	7.27	11.59	34.49	27.43	35.35
Geraldton (Innisfail) ...	33.74	24.57	11.90	19.35	1.34	7.42	11.51	3.18	7.30	4.77	36.96	35.51	28.39
Gindie State Farm ...	...	...	...	2.65	1.45	Nil	...	...	...	3.87	11.69	4.15	2.29
Herberton	12.40	3.50	1.85	1.70	Nil	0.88	0.58	0.43	4.93	9.71	11.43	13.16	15.35
Hughendea	2.95	0.30	0.41	0.85	0.48	Nil	2.75	1.57	3.41	1.13	9.15	3.76	0.17
Kamerunga State Nurs.	...	...	...	Nil	...	3.39	...	2.06	...	...	...	23.08	...
Mackay	24.31	6.18	3.73	5.70	1.1	0.48	4.32	0.7	2.67	2.15	30.52	13.04	14.41
Mossman	...	...	...	...	...	1.91	2.90	3.17	10.36	19.91	32.76	...	...
Rockhampton	19.84	0.61	0.59	5.98	1.67	0.23	1.62	0.99	4.17	2.46	9.64	21.07	6.39
Townsville	17.21	2.29	0.26	1.05	0.33	0.3	3.34	0.11	2.53	6.77	25.40	19.24	4.24
<i>South.</i>													
Biggenden State Farm	3.82	0.73	1.06	5.25	0.92	0.28	...	2.36	4.59	5.93	10.37	7.34	6.25
Brisbane	6.42	1.22	0.43	6.74	0.39	...	2.72	3.27	2.49	13.99	10.30	5.84	4.69
Bundaberg	8.92	0.31	0.19	6.17	2.10	0.16	2.33	0.70	8.39	1.58	21.05	9.75	4.31
Crohamhurst	19.35	3.39	4.44	11.78	0.63	0.70	2.30	3.83	3.31	6.20	28.85	19.20	16.67
Dalby	3.87	Nil	Nil	6.06	1.42	0.64	2.11	3.96	4.09	3.29	8.08	2.24	3.20
Esk	6.09	1.19	0.27	4.74	0.58	0.23	4.65	3.41	3.84	7.53	11.90	6.04	3.54
Gatton Agric. College	3.66	0.69	0.61	5.05	1.99	0.60	...	3.60	2.85	6.84	12.03	3.98	...
Gympie	7.74	1.13	0.22	5.57	0.83	0.32	1.54	2.90	3.16	1.96	9.13	5.33	6.02
Ipswich	3.56	1.65	0.20	3.74	1.67	0.58	1.55	3.70	1.96	5.04	8.15	4.19	2.51
Maryborough	3.92	1.72	0.64	4.89	1.09	0.35	1.22	1.53	4.19	3.19	16.93	6.58	7.20
Roma	8.36	0.15	0.4	5.71	1.24	Nil	0.46	3.64	4.39	0.96	11.52	5.94	1.25
Roma State Farm ...	...	...	...	...	...	...	0.38	2.95	3.50	7.97	9.72	...	5.39
Tewantin	15.18	6.30	1.31	15.08	0.76	1.34	1.52	3.17	7.71	8.25	20.84	8.50	18.11
Warren State Farm ...	...	...	...	1.88	...	...	...	0.45	...	...	...	11.75	3.17
Warwick	2.57	0.68	0.55	3.16	1.82	0.54	1.39	2.20	3.86	3.46	7.13	2.01	3.12
Hermitage	...	...	...	...	...	...	...	...	...	...	...	...	...
State Farm	...	...	...	...	1.73	0.39	...	...	...	4.44	5.26	3.90	1.76
Westbrook State Farm	...	...	...	2.77	...	...	...	2.98	...	...	...	...	...
Yandina	11.81	3.26	0.40	13.13	0.70	0.15	0.88	3.34	5.16	16.05	12.04	10.73	12.02

NOTE.—The rainfall data in this table are compiled from telegraphic reports, and must be considered as approximate only.

GEORGE G. BOND, Divisional Officer.

The Orchard.

With reference to a note on "Dwarfing Fruit Trees" which appeared in the issue of this journal for May, 1910, Mr. Godfrey Heigold, Eidsvold, now writes:—"Concerning the method of dwarfing fruit trees, graft an orange on a citron stock close to the ground and you have a dwarf orange. Graft a pear or apple on a quince, there will be a dwarf apple or pear tree." Mr. Heigold adds: "Try the experiment and report."

The above was submitted to Mr. C. Ross, Instructor in Fruit Culture, who states that the method is centuries old; it has been done millions of times with varied results.

DRIED PERSIMMONS.

Persimmon trees at full maturity bear so profusely that at times the growers cannot obtain a decent price for them. We learn from "The Farmer and Settler," Sydney, that the novel idea of drying the fruit occurred to an Epping orchardist—a Mr. Vollmer—who sent a sample to the Department of Agriculture, New South Wales. The editor writes:—"The idea seems to be Mr. Vollmer's own, for none are on the market, and, until we heard a week or two ago of this experiment, we had not thought of this fruit as capable of treatment by the drying process. Considerable quantities of this luscious fruit are grown at Epping, and Mr. Vollmer has found at times that the market has become overstocked, with the result that a portion of the crop is lost. If it can be preserved successfully, it must be a considerable source of profit and at the same time must become a very popular dessert, for those who have tasted them vote dried persimmon the primest of preserved fruits. In appearance it much resembles a fig, but without the seeds, and in flavour it suggests the date. It is—as Mr. W. J. Allen, the fruit expert, says—equal to any imported fig or date, being rich and pleasant to the palate, and having none of the numerous seeds that are the fig's chief drawback.

"The process adopted by Mr. Vollmer is a very simple one. The fruit was pulled while ripe and attached by string to a bamboo pole, which was then put in a shed in which the natural temperature was considerable. No artificial heat was used, but the shed was such as would attract the sun's rays. The process of drying occupied three or four weeks. Four varieties were tried by Mr. Vollmer with success—viz., Hayakume, Kumo-kumo, Tanenashi, and Dia-dia-maru.

"To the grower the result opens considerable possibilities for the establishment of a new industry, while for the public there is the prospect that they will in the future be able to enjoy a new and delicious dried fruit."

THE VALUE OF SPRAYING FRUIT TREES—THE BLACKBERRY PEST.

In his monthly report for March on the fruit industry in the Stanthorpe district, Mr. J. Henderson, inspector under the Diseases in Plants Act, records a remarkable instance of the complete recovery of an almost ruined orchard by means of an assiduous and judicious

spraying. In several orchards he found the fruit fly in the late apples, and in one of the Glen Aplin orchards the codlin moth was in evidence. The owner was instructed to take immediate action and to thoroughly overhaul the trees.

While inspecting Messrs. Wand and Green's orchard at Mountain Garden, he was surprised to find a number of six-year old apple trees (Munro's Favourite) in the pink of condition. The trees in question were in a deplorable condition some seven months ago, when the present owners took over the orchard. The trees were then very badly infected with American blight, and now are almost entirely free from that disease. This result has been obtained through spraying the trees several times during the winter months with a solution of red oil, and a weak solution of kerosene emulsion being used, after the foliage appeared, on the spots missed by the red oil spray, the emulsion being applied with a small paint brush. The trees, moreover, have made good growth, and, as already stated, are in a fine, healthy condition. The wounds caused by the blight have healed up, and have almost disappeared. The good results shown on the old trees point to the fact that red oil [combined with common sense, energy, and perseverance.—Ed. "Q.A.J."] not only destroys the American Blight, but also acts as a medium in excluding the air from the wounds made by the aphids, and allowing the bark to grow again. Mr. Henderson added that the trees in question produced some very fine fruit this season. Mr. Henderson appears to be successfully carrying on a vigorous campaign against the pests—insect, fungoid, and vegetable—which cause so much damage to fruit-growers, notably in having numbers of trees destroyed in old and neglected orchards, such trees being a menace to a number of young orchards in the Broadwater district. They were seedling trees and badly infected with the American Blight. Seeing that it has been clearly demonstrated that, even after six years, the American Blight can be overcome, as in Messrs. Wand and Green's orchard, there can be little excuse for fruit-growers who suffer this disease to go on, if not entirely unchecked, still attacked in merely desultory fashion. Not only are they playing a losing game for themselves, but are, possibly unwittingly, the direct cause of serious loss to others; and it is to be hoped that sufferers from this or any other pests will adopt the same vigorous measures to stamp them permanently out of the finest fruit-growing district in the State.

The blackberry pest, which threatens to become very serious in Stanthorpe and on the border unless prompt attention is given to its eradication, has also been attended to by Mr. Henderson, who has experimented with a spray which certainly killed the leaves and stems, but young shoots showed again from the roots.

In this connection we may quote the following notes on the eradication of the blackberry, by Mr. Alexander Douglas, of Cooroy:—

"In the current number (April) of your Journal you have an article on the blackberry, and, as I have had some acquaintance with the pest, and since it would seem as though the danger of it was not apparent to either farmers, Government, or local authorities* I am presuming to write to (if possible) emphasise the great need of instant measures being taken for its complete eradication. Whence I came in Victoria—viz., South Gippsland—we had a bitter experience of this bramble, which, with alarming rapidity, spreads over the ground and establishes itself in places where it is exceedingly hard to eradicate it. The seed is wonderfully strong and prolific, and is carried by birds, by

*Active steps are being taken by the Department of Agriculture and Stock to cope with the blackberry pest at Stanthorpe.—Ed. "Q.A.J."

the streams, and by the human being, through the agency of excreta, so much so that children were specially forbidden to eat the berry, this being one of the ways in which the plant was distributed. The plant, once established, throws out long runners which take root like strawberries, and which again throw out more runners like a great octopus, so that from one little plant, in two years, I have seen a great patch many yards square covered. Not only does it establish itself quickly over the surface, but the root system forces itself down to an amazing depth, and the sorry part of it is that a particle of root left in the ground will again throw up a plant; so that to thoroughly eradicate the pest the whole of the roots must be torn up. A particle of root left on the surface will again strike and become a prolific and hardy plant in a season. I have seen a patch hoed out with a grubber, and every root, as was supposed, picked out; but, when the crop was sown and taken off it was found to have a multitude of plants of the blackberry again growing, and for several years this same patch was hoed and dug; yet each year a plant here and there would be found. This is only one of many instances of which I could state; sufficient to say that this plant should be proclaimed, and immediate and drastic steps be taken for its destruction. In this relation it was found that the refuse sulphuric acid, which is for the most part thrown away from butter factories after it has done its work in the testing-room, proved an efficacious, albeit a somewhat costly remedy. Those farmers who may have this bramble established should take warning and see to its destruction at once or in a very short time they will find, to their sorrow and cost, how hard it will be to rid themselves of it, and how it will spread over their land; and it seems to me that, with the beautiful climate of Queensland, this pest will prove much worse than in South Gippsland."

MANUFACTURE OF PLANTAIN FIBRE.

We have frequently advocated the utilisation of plantain or banana stems, after the fruit has been gathered, in the manufacture of fibre, of which every stem contains a considerable amount, worth about £20 to £21 per ton; but, whilst sugar, bananas, pineapples, and dairying are well-understood and well-paying industries, those engaged in them are not prone to take up anything new. So we leave a profitable industry to black labour countries, and then buy the produce from them at a high price plus a heavy import duty. Now we learn from the "Bombay Gazette" that "A company is being formed to manufacture plantain fibre in Lower Burma. Raw material is to be had in abundance, and the value of plantain fibre is well known. All that is wanted is good management. A capital of 5 lakhs (500,000 rupees or about £42,000) is being raised, with the power to increase this sum. This is divided into 50,000 shares of 10 rupees each. The first factory is to be started at Yanthelin, in the Henzada district, and others will follow in various parts of Burma, wherever plantain trees are abundant."

Horticulture.

BUSH-HOUSE WORK.

At the March meeting of the Charters Towers Horticultural Society, Mr. C. E. Parkinson read the following useful paper on the "Culture of Ferns and Foliage Plants":—

"Papers on building a bush-house and soils for potting have already been read before this society, so I will only give you my experience since I started a bush-house, and, being only a new beginner in bush-house work, I hope that those who have had greater experience will not be too hard on me when the paper is open for discussion. The first item is to have clean pots, and if pots are new it is a mistake to think they are clean and ready to put delicate plants into. Place the pots into a tub or small tank of water for two or three days; then give them a good scrubbing, and place them out in the sun for a week. Pots that have been in use a while become covered with a slimy green growth; remove the plant into a clean pot, then plunge the pot into hot water and scrub, afterwards rinse in clean water and place in the sun. When you receive the plants from the nursery, they are generally root-bound, through being raised in very small pots and left in them, so that the expense of freight is less when sending out. Take the pot in the left hand and tilt slightly; then with a piece of wood gently push the plant out, or the pot can be turned upside down and the plant taken out by knocking the pot gently against a bench, always having your fingers through the plant to prevent it from falling. Then start gently at the bottom of the ball of roots and gradually work out the broken crocks and charcoal; then most of the soil. By doing this the roots will be spread out and quicker, and better growth will be made; also you will be able to pick out any worms, &c., that, if left in, would soon affect the drainage and have to be repotted, or the plant would soon suffer. Do not put the plants (which when you received them were in 3-inch pots), into a 10-inch pot; this is a big mistake; put them into a size larger pot; and as long as the plant is doing well let it alone or until you see the roots peeping out of the bottom of the pot. When repotting, press the soil firmly, and stand the pot in a tub of water—enough water to reach the rim of the pot. You can leave it there until you have another pot ready; by doing this you saturate every particle of the soil. In the summer time plants need to be watered every evening; if you miss any, you will notice it the next evening by shrivelled-up foliage. In the cooler weather water them every second day, in the morning. It is better to water the plants with a can without the sprinkler for the majority of the ferns; by doing this you can give every plant just what it requires; if using a hose, the tender fronds get broken, and if the water is dirty, the mud sticks to the leaves and spoils the beauty of their foliage. If the ferns or plants are in a basket, soaking them once a week will be found beneficial. I find that ferns thrive much better when in baskets, which are easily made with galvanised wire and wire-netting, and the basket lined with peat, fibre, or tee-tree bark, with a liberal amount of charcoal near the bottom to keep it sweet. I have never used liquid manure in the bush-house; if this is used, it should be made very weak, and the plants watered with clean water before and after using. Saltpetre is recommended as the best of all chemical manures for plants—a teaspoonful to a gallon of water. When mealy bug or scale make its appearance on the plants, lay the pot

on its side, and wash the affected parts with soapy water applied with a sponge. By laying the pot on its side, none of the liquid will run down to the roots and injure them. Palms suffer the most from the black scale; a little boiled starch painted on the affected parts will take the scale off and do no damage to the palm if done carefully. Palms are one of the bush-house plants that need the foliage watered as well as the roots. When worms are in a pot, they will come to the surface if the pot is plunged into a solution of lime and water, they can be then picked off.

"Adiantums can be raised here from the spores if the old fronds are placed on some peat and kept moist (but you cannot raise them in a fortnight). When the young plants are just large enough to handle, clip them out of the peat with a pair of scissors and put the young plants into thumb pots. Aspidiums should be potted with more peat and charcoal; the adiantums and the compost pressed firmly around them. Davallias or hare's foot ferns do best in baskets made up of peat and fibrous loam.

"Most of the Lycopodiums or Selaginellas thrive the best in the shadiest part of the bush-house. One of the most useful ferns are the Nephrolepis family; it contains some of the handsomest and easily grown ferns, and make splendid basket specimens. There are a number of new varieties of this beautiful fern that have been raised during the last few years. Amongst the best are Amberholi and Magnifica; these are what *Gracillimum cristatum* is to the Adiantum family, having most beautiful and fine foliage; these ferns can be easily raised. When the hangers or roots appear through the basket, pass them gently through the netting or peg down with a hairpin, and in six weeks you have a nice little plant. Pteris are a handsome fern, but do not seem suitable to our climate, or perhaps we do not understand them properly.

"Foliage plants—Alocasia and Anthurium—need plenty of drainage and water; they go to rest in the winter time and when the spring comes the roots can be divided; they also make beautiful baskets.

"Diffenbachias and Dracaenas are two of the most useful foliage plants grown. There are a great many varieties of all shades and colours, and most easy of cultivation. Young plants are propagated by cuttings, and, as the old plants become leggy, a number of young plants should be kept coming along.

"Rex Begonias root easily from the leaf. Get a flat, shallow box, and fill it with a light, compact fibre dust and sandy soil, and place in a shady part of the bush-house. Take one of the older leaves with about half an inch of stalk, and put in the compost and press firmly; then cut through the thick ribs in three or four places, and peg down with a few hairpins. New growths will soon start, and the plants can be picked off and potted up into small pots, using free open potting soil.

"Peperomias, Frittonias, and Gloxinias may be struck the same way as Rex Begonias. Achimenes, Gesnera, and Tydæa make fine baskets during the summer months, producing in abundance flowers ranging through a great many colours, and are the admiration of all who see them. During the winter months, when at rest, they should be left without water and placed in sand and started again in the warm weather. It would take a dozen papers like this to give anything like a detail of the different plants that can be grown in a bush-house. A year or so ago hardly anyone would think of a bush-house on Charters Towers, and they were told ferns, &c., would only grow near the coast; but we have discovered, with a little care and attention, everyone can have one, that during the hot weather, when everything outside is parched up, and the sun blazing hot, you can go in and spend an hour or two and have something beautiful to be seen for your trouble."

Apiculture.

THE CONTROL OF SWARMING.

The beekeeper is engaged in a perpetual struggle against the swarming impulse of the bees. If he cannot control it he loses honey and profit, for the energy they put into increasing the number of colonies should, the beekeeper thinks, be devoted to accumulating further stores of nectar.

Many methods have been tried, most of them, however, calling for much time and care. The latest invention is described by the originator in "Gleanings in Bee Culture," and our article is abridged from that, with the illustrations from the same source.

THE NEW CONTRIVANCE.

The mechanical portion of the invention consists of a double bottom board on which will stand two eight-frame hives, separated only by a 1-inch strip. A rim round the outside, standing 1-in. high, forms a space



FIG. 1.—Two hives standing on Hand's double-bottom board with the system in operation.

of that width under the frames. On each long side of the bottom board—which is the end of the hives—is a large entrance, $\frac{1}{2}$ -inch high and 12-in. long. These entrances lead underneath the hives, and by the movement of the lever (A and B) the bees are directed into whichever of the hives we wish. The levers stand out through the entrances, and by putting them over to either side the inner entrance to that hive is closed, and that on the other side opened. In Fig. 2 the central piece G is removed to show the levers, which are hinged to a central frog and move underneath it.

Besides these two main entrances, there are two subsidiary entrances at the ends of the stand (the sides of the hives), $\frac{1}{2}$ -in. high and 6 in.

in length; these may be closed by lowering the lever I. The one at the other end in Fig. 2 is hidden by the displaced centre piece.

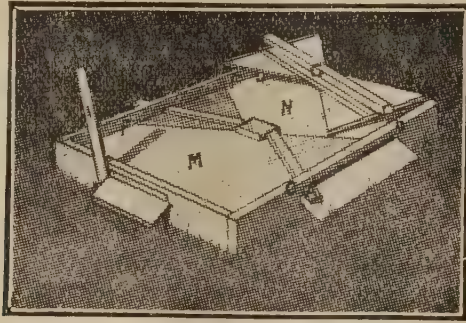


FIG. 2.—Hand's bottom board, with centre-piece removed, to show closing levers A and H.

The reader by studying the illustrations will see that the flying bees, by the operation of the levers, may be directed into either of the hives when returning to their usual entrance; also that, when by the closing of an entrance the field force is directed into another hive, there is a subsidiary entrance for the young bees—which may hatch out later—to get to and from the hive.

The method of operating is thus described by Mr. Hand, the inventor:—

HOW IT IS OPERATED.

When the harvest is in full swing, and the top story is about half full of uncapped honey, assuming that each colony is provided with a switchboard, we will begin operations for the control of swarming by placing the top story, bees and all, down upon the vacant side of the switchboard, and exchange the central comb for a comb of brood and bees, including the queen from hive No. 1; put on a queen-excluder and a super of sections; close the hives and throw the switch, thus closing the inner entrance to hive No. 1 and at the same time opening the inner entrance to No. 2 without changing the appearance of their outside entrance.

The returning field bees, laden with nectar, will enter the new hive through their accustomed entrance without a moment's hesitation, and no time is lost to the bees in getting accustomed to new surrounding, which in the midst of a good honey-flow means a gain of several pounds of honey over other methods, where bees are shaken and otherwise unduly excited, by throwing them into an abnormal condition, causing them to sulk and loaf for a day or two, when a colony in a normal condition would show a gain of 5 lb. to 10 lb. per day.

The switch on the back side is thrown in the opposite direction to provide a new entrance for colony No. 1, which has been so smoothly robbed of its field bees, and which should now be given a queen. The honey in the new brood-chamber will go into the sections to make room for brood.

A strong point in the new system is that the brood in colony No. 1 is held in reserve to reinforce the swarm; therefore, as soon as a goodly force of young bees are again flying from No. 1, which will be in about eight to ten days, we will throw the switch on the back side again, closing the entrance No. 1 and opening the inner entrance to No. 2. The returning field bees will scamper into hive No. 2 pellmell, deposit their load of nectar, and scud to the fields as though nothing out of the ordinary had happened. This is what we understand by perfect control of bees.

Hive No. 2 is now crammed full of bees with an entrance at each end $\frac{1}{2}$ -in. by 12-in., and a 1-in. space below the frames, both of which are important factors in solving the problem of swarm-control.

The entrance to No. 1 now being closed, we will again provide a new one by opening the auxiliary entrance on the side. This will usually settle the swarming question during an ordinary honey flow; however, should the harvest continue until the brood begins to hatch in No. 2, it is advisable to shift the field bees back into No. 1. This is easily and quickly done by reversing both levers, thus closing both the inner entrances to No. 2 and opening both the inner entrances to No. 1, transferring the supers (bees and all) over to No. 1. The entrances to No. 2 being now closed, we will open their side entrance.

All four entrances are now open, and the side entrance to No. 1 may be closed in a day or two; otherwise it will serve as a check to the next shift. Since the bees that have a habit of using that entrance which will not be shifted by the levers, these entrances are also used as safety-valves against the possibility of weakening a colony so as to cause the loss of brood. It will be noticed that, after the first shift, positively all that is required to control swarming is to throw the switches once in eight to ten days and transfer the supers. The hives being so close together, this can be done without moving from one's tracks; however, during a good honey-flow it will, perhaps, be necessary to add an empty super at each shift, which may be placed at the bottom and the partly filled ones (bees and all) on top.

At each shift a strong force of young bees is called into action to strengthen the swarm, which is steadily increasing in numerical strength instead of decreasing, as is the case with natural and shook swarms. If no increase is desired, no queen is given to No. 1, from which the bees are shifted over into No. 2 at intervals of ten to twelve days. After the second shift but few bees will remain, and the hive and combs may be used as desired.

A noticeable feature of the system is that the double entrances always go with the strong colony, and the small side entrances with the weak one. As a further aid to swarm control, we usually raise the back end of the cover during very hot weather. Thus the field bees may be shifted back and forth from one hive to another automatically at intervals of eight to ten days without disturbing their equanimity in the least, or interfering with the serenity of their usual occupation.

Again, this is what we understand by perfect control of bees. Sectional hives have no advantage under the new system, since the new principle reduces frame handling to the minimum, and handling brood-chambers.

Mr. Hand recommends his method for a locality where the main harvest comes from clover or other early blooming flowers. For a later source of honey the aim should be to have hives full of bees "boiling over" just as the harvest will be ready. He contends that by his method this can always be secured and that the element of chance swarming will be entirely eliminated.

To increase the number of colonies it would only be necessary to remove colony No. 1 to a new location and replace it by an empty hive. Into this hive place two combs of brood and bees from No. 1, filled up with full sheets of foundation or combs, and give the colony a queen.

The bottom boards, as described, could be made by any man handy with tools, as most beekeepers are; but no doubt they will soon be obtainable, machine-made to standard sizes, and purchasable with other supplies.—"Farmer and Settler."

Tropical Industries.

COTTON-PICKING MACHINE.

Mr. T. A. J. Place, Division of Tobacco and Cotton Industries in the Transvaal, has a lengthy but most interesting and valuable article in the "Agricultural Journal of the Union of South Africa" (which has now superseded all the Government agricultural journals of the States of the Union) on the subject of cotton-growing prospects in the Transvaal. He puts the cost of production in that State at £1 17s. per acre, and the resulting crop at 1,000 lb. of seed cotton, or 300 lb. of lint, which at 5d. per lb. gives a net profit of £4 8s. per acre, or, at the present price of cotton, 8d. per lb., a profit of £8 3s. per acre. Discussing the harvesting of the crop, he says that the picking of cotton is a difficulty to be faced in South Africa, mainly owing to a shortage of native labour. What is sorely needed is a suitable implement to perform this work. One or two inventors have taken the matter in hand in the past, but their attempts have not proved very successful. However, it would seem that a great stride has recently been made in this direction in the United States of America by Mr. Crawford Elliot, inventor of the book typewriter. Mr. Place quotes from the "Hopkinsville Kentuckian" of 28th July, 1910, as to this implement, and remarks that the enormous influence which will be brought to bear on the cotton-growing industry by this invention cannot yet be fully realised. The fact that a commercial firm of implement makers has purchased the invention speaks volumes for the practical value of the new machine. The "Kentuckian" says:—

"Washington, 24th July.—Patents were issued to-day to Crawford Elliot, the inventor of the book typewriter, on a cotton picker or harvester which he has perfected as the result of nearly seven years' constant effort. . . . The machine has been tested for two years in the cotton fields, and, with it, one man and a team of mules will do the work of forty hand-pickers. Only the ripe cotton is picked, and this is done without injury to the green cotton or the flowers. The successful cotton-picker has at last arrived and will enable the planter to greatly increase the present acreage under cultivation. The principle of the machine is a double row of bristle brushes, about 1½ in. in diameter and 14 in. long, spinning rapidly in such a manner that the revolving brushes are introduced into the plants close to the ground and drawn up in a vertical line through the plants, the brushes penetrating the bushes from both sides of the row. The ripe cotton adheres to the brushes, while the rest of the plant is not in any way affected, the brushes travelling to a receptacle where they are stripped of the cotton and the operation is repeated.

"It has been thoroughly tested and demonstrated that it will do the work at a quarter of the cost of hand labour, which means the saving of 150,000,000 dollars (£3,000,000) a year to the cotton-growers.

"The invention, which has been purchased by the National Cotton Harvester Company, of Chicago, means much to the growth and expansion of the cotton industry, and it will undoubtedly add immensely to the annual wealth of the cotton-growing States."

If we remember rightly, the brush principle was tried some years ago in America, but no practical results eventuated, but cotton-growers all over the world will hope to see Mr. Elliot's machine a perfect success.

Mr. Daniel Jones, of the proposed Central Queensland Cotton-growing Company, now in course of formation for the purpose of

growing cotton on a large scale near Capella, has also invented and, we believe, has patented a pneumatic cotton-picking machine capable of picking 200 or 300 lb. of cotton daily, only the ripe cotton being picked, the plants and partly opened bolls being left undisturbed. The amount of cotton picked by it does not seem much for machine work, but when we consider the difficulty of obtaining suitable labour at picking time, and the high wages demanded by field workers, not to mention the possibility or even probability of a strike in the height of the picking season, the use of such a machine must prove of incalculable value to the cotton-grower.

COTTON IN ALGERIA.

Owing to high prices and to the anticipated shortage of cotton in the United States, Egypt, and elsewhere, great efforts are being made by the Administration of Algeria to encourage the planting of cotton in that country. From figures published in the "Public Ledger," it would appear that cotton thrives admirably in the district of Orleansville, and the authentic returns obtained by the growers show that the yields per acre quite equal, if they do not surpass, those of the most favoured portions of Central Queensland. It should, however, be remembered that the Algerian cotton lands are all irrigated; whereas in this State equally good results are obtained without irrigation. It was in 1908 when the experiments were first started on irrigated land at Orleansville, and a crop was sold at Havre at the rate of 8 $\frac{3}{4}$ d. per lb., representing a net profit to the grower varying from £5 10s. to £12 10s. per acre, whilst an offer of 9 $\frac{1}{2}$ d. to 9 $\frac{3}{4}$ d. for the same consignment was received from Liverpool. More recently, a first shipment of 10,000 kilos (about 10 tons) has realised 1s. 2 $\frac{1}{2}$ d. to 1s. 3d. at Liverpool. The crops gathered on these lands have varied from 1,200 (2,700 lb.) to 2,500 (5,625 lb.) kilos. of raw cotton, yielding from 380 to 800 kilos. of yarn per hectare, which, at the prices last quoted, with the addition of by-products at market prices, would produce a revenue of from 1400 (£58.6) to 3,000 fr. (£125) per hectare (2.47 acres); the cost of cultivation, in the case of the grower who shipped the above consignments, was 557 (£23.4) fr. per hectare; in some instances it is more, but it has never reached 1,000 fr. (£41 13s.); so it is estimated that the net profit on cotton-growing on these lands amounts to between 850 and 2,000 fr. per hectare, or approximately from £14 to £32 per acre. This calculation is based on abnormally high prices, but with ordinary figures the yield would still be very large. Experiments, which have been continuously successful, have also been conducted on lands impossible of irrigation; at Phillippeville 17 acres of Mississippi and 11 acres of Egyptian Mitafifi have produced 154 cwt. and 85 cwt. of raw cotton, respectively, whilst at Bone 130 cwt. and 133 cwt. of these respective varieties have been obtained from two plots of ground each containing about 15 acres, giving an estimated net profit of £11 an acre. In comparison with these figures, it is pointed out that in the United States the average net profit to the cotton-grower, calculated over a period of twenty years, is between £1 18s. 6d. and £2 13s. 6d. to the acre, whilst in Egypt it has been shown not to exceed £1 15s.* On the above grounds, and in view of the high prices anticipated as the result of the shortage in America, Egypt, and elsewhere, local agriculturists have been strongly urged to lay down their ground in cotton, and several hundred additional acres are now in course of cultivation.

* In Queensland the net profit has ranged from £6 to £16 per acre.—ED. "Q.A.J."

Last month it was announced that a German company has been formed to grow cotton on a large scale at Capella, in the Central district, 187 miles by rail from Rockhampton, where land has been acquired for the purpose by Mr. A. C. Schadler, late emigration agent for Queensland in Germany. On this land there will be settled 1,000 Germans, whose energies will be devoted almost exclusively to cotton-growing. Mr. Daniel Jones has, we understand, been appointed manager, and already a ginnery is being fitted up in readiness for the first crop, which will presumably be planted in August next. Should this company prove successful, and there is no reason why it should not be so, given good management, favourable seasons, and continued high prices for lint, and such a price for seed as is now ruling (£8.4) per ton, there will doubtless be many others who will follow the example of the plucky enterprise of the Germans. Long ago it was practically proved that exceptionally large returns were obtained in the Central district, notably by Mr. Sanderson at Stanwell.

THE SUGAR INDUSTRY—REPORT OF THE COMMISSION.

We much regret that the limits of this journal will not permit of the publication *in extenso* of the valuable and highly interesting report of the Central Sugar Mills Commission issued last March. It runs into nearly 200 pages, and will doubtless have been read with deep interest by those who are desirous of having a central mill erected in their district, and who either have planted or who propose to plant a sufficient area of cane to keep such a mill going. There is, of course, some disappointment and some jubilation over the recommendations of the Commission as to the most suitable districts in which the erection of central mills would result in financial success. The conclusions arrived at are briefly as follows:—

“As a result of much deliberation we are of opinion that in view of the paramount importance to Queensland and to Australia as a whole of close settlement for defence and development purposes of the north-eastern coast-line of this State and of the shores of the Northern Territory of South Australia, settlement is only attainable by permanent location thereon of an agricultural population. It is highly improbable that the Legislature controlling the destinies of the Commonwealth and of the sugar industry will at any future time take action which will defeat such objects.

“We are influenced in determining that new central sugar mills should sooner or later be erected at—

Firstly (for the season of 1913)—1, Babinda Creek (Russell River), 10,000 tons; 2, Darradgee (Johnstone River), 5,000 tons; and (subject to the condition that no mill is to be established at Inkerman) 3, Jarvisfield (Burdekin River), 5,000 tons.

Secondly (for the season 1914)—South Branch of the Johnstone River (Innisfail), 8,000 tons.

Thirdly (upon the conditions hereinbefore mentioned)—Freshwater (Cairns); Liverpool Creek; Tully River (Cardwell); Long Pocket (Ingham); Bailey's Creek; Hamilton (Gargett, Mackay); Silent Grove (Mackay); Aloomba (Cairns); Don River (Bowen).

The application for central mills not specially dealt with include Kelvin Grove, Rockhampton, Yeppoon, Gympie, and Atherton. As we have already indicated the order of precedence in which, in our opinion,

central mills sufficient for the requirements of several years should be erected, we make no recommendations in respect of these applications.

Upon the third recommendation the Commission say that the further erection of central mills should be allowed to remain open to review by the Treasurer from time to time. Should necessity arise for such further erections, the site or sites of same should be in the order given. The Commission urge that legislative authority be obtained for—

- (a) Securing the resumption, if necessary, of lands required for mill and town sites, tramways, drainage, water reserves, water rights, and easements generally;
- (b) The constitution of central mill areas;
- (c) To empower a central mill company to levy a tax upon all lands within the benefited area classified as "cane lands," for the purpose of paying any moneys in arrears in respect of interest and redemption;
- (d) The resumption of any existing hotels within any of the new central mill areas, with a view to closure of same.

"In reviewing the success or failure of central sugar mills established under the provisions of 'The Sugar Works Guarantee Acts, 1893 to 1898,' it has become apparent that mills erected within the coastal tropical zone, where the climatic conditions for the growth of cane are most favourable, have been operated with the greatest measure of success. This is readily accounted for by the fact that the sugar-cane is essentially a tropical plant, thriving in those regions at low altitudes and in a humid atmosphere. From the evidence adduced, it is clearly proved that vast areas of suitable sugar-cane lands are still available within the coastal tropical zone in Queensland, and that cane-growing at present constitutes within those areas the only profitable agricultural industry under white labour conditions. And it must be admitted that if these lands are to be developed and settled by a white population engaged in agriculture, preference must be given to this portion of the territory, in determining localities in which to establish new central sugar mills."

As far as the production of beet sugar in Victoria is concerned, the Commissioners expressed the opinion that the industry in that State was as yet merely in the experimental stage, and that even should success attend their experiments, it will, in all probability, be some years before the production of beet sugar will materially affect the Australian market.

PAPAW CULTURE IN THE PHILIPPINES.

Mr. Jesse, of Jolo, tells of his method of raising papayas as follows. The process of cultivation is divided into four stages:—

First: The sprouting stage—The seed should be planted in boxes, about 18 in. by 18 in. by 8 in., containing rich earth, with which is mixed a couple of handfuls of bone ash and 15 drops of tincture of iron. Plant the seed about 1 in. apart and bury about 1 in. below the surface. The surface should be sprinkled lightly with water about sundown. In about a week the young shoot should appear, and at three weeks the shoot should be about 8 in. high.

Second: The stage of preparation of the soil for the transplantation of the young shoot and its early development—Having located the site for the tree, dig a hole about 2 ft. in diameter and 1 ft. deep. Procure enough rich earth mixed with bone ash to fill the hole, and then sprinkle 15 drops of tincture of iron over the surface. Now dig up your sprout, being careful to retain the earth about its roots, and bury about 2 in. deep. In order to protect the young shoot from the direct sunlight, drive four

sticks into the ground around the sprout and suspend a gunny sack. After about two weeks, the young plant will have adjusted itself to its new home, and the sunshade may be removed. By this time the plant should be in a flourishing condition and in three weeks should be 3 in. in diameter at the base.

Third: The forced nourishment stage—Bore a hole into the trunk about 6 in. from the ground, 1 in. deep and of a diameter slightly larger than that of the red rubber tubing obtainable at your drug store. Fill a quart bottle half full of sugar and dissolve in water. When the sugar is thoroughly dissolved, connect the bottle with the hole in the tree by means of the red tubing. In twenty-four hours the tree will have absorbed the contents of the bottle.

Fourth: The fruit-bearing stage—If the young fruit appears too numerous, it is well to pluck the least promising. Then, if the tree is unable to support itself, prop it up. At five months some of the fruit on the lower cluster will show streaks of yellow. Now is the time to hasten the ripening. This is done by wrapping a gunny sack about the lower clusters of fruit and the trunk. Crows are very fond of the ripe fruit, and this expedient serves also to scare them away. When yellow spots about the size of a peso appear, pluck the fruit and place it in a cool dark place for several days. By this time the fruit should be yellow over the greater part of its surface, and will gently yield to thumb pressure. It is now ready for the ice-box. If the fruit is allowed to turn yellow before it is plucked, much of its strength is drawn back into the tree, to be supplied to other fruit in a less advanced stage of development. If these directions are followed, your trees ought to bear fruit 10 in. to 12 in. long, and 6 in. to 8 in. in maximum diameter.

Once a year sprinkle bone ash over the surface around the base of the tree. This should be sufficient fertilisation.

The tree (Javan) at maturity varies from 15 ft. to 20 ft. in height and is about 7 in. in diameter at the base.—“Mindanao Herald.”

RUBBER TREE TAPPING.

The following notes on the “Cambium” by R. D. Anstead, Planting Expert, appear in the Indian “Planters’ Chronicle”:

“Since rubber has been tapped the ‘cambium’ has become a household word, and a sacred thing not to be touched or damaged, but frequent inquiries indicate that much misunderstanding exists as to the functions of this tissue, and why it must not be damaged. The text book defines the cambium as ‘a layer of tissue formed between the wood and the bark, and consisting partly of nascent wood and partly of nascent bark.’ If the bark is stripped from the wood of any tree, the separation takes place at the cambium, which is a thin layer of very delicate tissue. In the bark are channels, like a system of pipes, down which flows the sap carrying the food materials manufactured in the leaves, by the energy supplied by the sunlight, from the carbon dioxide obtained from the air and the plant foods like nitrogen, phosphoric acid, and potash, dissolved in water, carried up through a similar system of pipes in the wood. This supply of worked-up food is distributed to all the growing parts of the tree, both roots and stem, and some is stored up for future use in the form of sugar and starch. The latex, which is also formed from this wood material, is contained in a system of cells in the bark outside the cambium, and these are quite independent of the sap-conducting tissues which occur in all trees, while latex is only found in a few special trees. If the bark is cut through all round the tree, the downward flow of sap is stopped, and the supply of manufactured food

cut off from the roots, and everything below the cut, resulting in starvation and ultimate death. This is why a tree dies when it is ringed. Here the special function of the cambium comes in. It is constantly growing and forming new tissues, wood on the inner side and bark on the outer, and when the bark only is removed the cambium heals up the cut, grows new bark over it, and reconnects the broken system of cells conveying the sap, and makes new latex cells. Hence the importance of not cutting and killing the cambium, and of not tapping a tree all round its circumference at the same time. Excessive tapping weakens a tree, not so much by withdrawing all the latex, probably, but by cutting off too much of the food supply from the roots.

"Injury to the cambium means the cessation of growth; new bark is not formed, and the cut does not heal. If the injury involves a large portion of the cambium, it is obvious that this is serious; where the injury is not extensive, a renewal of growth soon takes place."

Mr. Anstead also writes as follows on latex collecting cups on plantations:—

"The advance made recently in cups for collecting latex on rubber plantations is of more than usual interest. Four or five years ago it was the custom to use, on many Eastern plantations, cocoanut shells in preference to ordinary leaves or bamboo cups employed in Brazil and Africa; these were popular on account of their cheapness and cleanliness, and were replaceable at a very small cost. Tin, aluminium, and subsequently galvanised iron and enamelled cups were largely used, but it was soon found that these corroded, and were apt to discolour the latex or scrap rubber in the cups. The place of these has been taken by glass, earthenware, and Chinese paper cups; the latter being preferred on account of their not being so easily broken and their comparative cheapness. Having run through a good variety of utensils and selected what appear to be reliable forms of collecting cups, the planters are now engaged in evolving a scheme whereby theft can be reduced to a minimum, and cleanliness maintained. In both cases only one cup per tree is used; in one case the cup when empty is turned, mouth downwards, and placed on the top of a stick some 2 ft. or 3 ft. from each tree, and projecting about 1 yard above ground; in the other case each empty, clean cup is lodged on some projection from the tree above the height of the tapping area. In each case the manager can see all the cups, and can thus detect loss by theft or otherwise; furthermore, the cups, being upturned, are clean when the tapper commences his morning round instead of being partially filled with dirt from the splashing of rain on the ground, fall of leaves, &c. As the same tree is not tapped morning and evening of the same day, one cup should suffice per tree under this system. We cannot see the reason advanced by some planters who insist on two collecting cups for each tree tapped on alternate days."

MANILA HEMP SCUTCHING MACHINE.

Plants of the banana family all contain a large amount of valuable fibre, the best being that derived from the *Musa textilis*, which grows wild in the Philippines, having been, it is believed, originally obtained from Papua. Under the name of "Manila hemp," large quantities are annually exported from Manila, notwithstanding that the whole of it is produced by hand labour. Messrs. Landauer and Company, London, in their report of the hemp market for 15th February, state that since 1st January, 1911, 162,000 bales were shipped to various countries, the United Kingdom taking 61,000 bales and the United States 74,000 bales, the balance going to the continental and other ports. The total quantity

afloat and loading for Europe between December, 1910, and January, 1911, was 146,011 bales; and for the United States, 84,000 bales. Several machines have been invented, and, so far as we can learn from the "Philippine Agricultural Review," "only four are on the market at this time, but none are in extensive use. An attempt was made during the last Philippine carnival to have all these machines on exhibition, but only two companies exhibited." At the Great Fair held in February last, where one would expect that hemp machines would have been exhibited, the only mention made of them is an invitation in "The Mindanao Herald" to "see the stripper at work," whether a machine or a native is not stated. The same journal, however, in a previous issue, has the following notice of a hemp-stripping machine:—"The McLane Hemp Machine Company is preparing for a complete demonstration of the economic value of their hemp machine at the coming Fair. Good clean hemp fibre has varied little in price the last few years, but the general tendency of the hand strippers has been towards careless work with increasing inferior fibre as a result. This inferior fibre has steadily fallen in price until now other plant fibres are displacing it in the world market and Philippine hemp is threatened with disaster. The constant effort necessary to get enough labour to keep the native hand stripper keyed up to his best work makes it impossible to hope for steady fixed standards in hemp. This will only be arrived at by machine stripping. The McLane machine has met the utmost demands of the hemp experts in the quality of fibre turned out—to which end they have spared neither time nor money. It is also claimed that the McLane machine will now turn out more hemp than has ever been possible before. It is hoped that all the different hemp-cleaning devices will be present at the Fair; but in any case the McLane machine will be there, and will be well worth an effort to see by all those who are interested in the future of hemp."

An advertisement in the above journal of the 28th January announced that a hemp-stripping machine contest would take place on the Fair grounds on the 11th February.

If the McLane machine was exhibited at work at the Fair, and did all that was claimed for it, it would be interesting to have the full particulars, because, in the event of its being an absolute success, there would probably be a demand for the machine both in Queensland and Papua, where thousands of banana stems are destroyed every year. We find no mention of it in the latest issues of the "Philippine Agricultural Review," published by the Bureau of Agriculture, Manila.

TOBACCO IN THE UNITED STATES.

It has been reported by H.M. Consul at St. Louis (Missouri, U.S.A.) that at a convention of the White Burley tobacco-growers of Kentucky, Ohio, and Indiana, on 5th January, it was decided that, since a large quantity of the 1909 crop, as well as the whole of that of 1910, is still on hand, no Burley tobacco shall be grown this year. No delegates were present from West Virginia or Missouri, where, however, but a comparatively small proportion of the Burley crop is said to be grown. The White Burley tobacco crop is stated to amount to more than 300,000,000 lb. annually. The White Burley has a long, broad leaf, white in appearance, while growing. The points of the leaves hang down, often touching the ground. The leaf is used for fancy wrappers, plug fillers, and for cutting purposes. There is another variety of the White Burley with narrow leaf, twisted bud, not so tender, and the ends of the leaves do not touch the ground. Burley is grown in the States of Ohio, Kentucky, Virginia, Maryland, Missouri, and Indiana.

Chemistry.

ANALYSES OF FERTILISERS.

By J. C. BRÜNNICH AND F. SMITH.

Since the introduction of "*The Fertilisers Act of 1905*" it has been customary to check the composition of all our commercial fertilisers by getting our inspectors to collect once or twice a year samples from all dealers, and to have these samples analysed at our Agricultural Laboratory.

A complete list of these analyses carried out recently is herewith published for the information of farmers.

In accordance with the Act, every dealer, manufacturer, importer, or agent who deals in fertilisers for the purposes of trade is required to register each year, giving the names or brands of fertilisers dealt in by him. We have now fifty-six registered dealers in our State. Upon the sale of any fertiliser the seller must supply to the buyer an **invoice certificate**, signed by the seller or his agent, stating full name and place of business of the seller, trade mark, brand, or other sign used to identify such fertiliser; quantity of the fertiliser or net weight in lb.; and the composition of the fertiliser, giving the respective amounts of nitrogen, phosphoric acid, and potash contained therein. Such a certificate can be attached in form of a label to each bag or package, or it may be supplied separately in form of printed slips, but the **bag must be distinctly branded** with the number of net pounds of fertiliser in the bag or package, and the figure, trade mark, or sign under which the fertiliser is sold.

The latitude allowed under the Act, in any **deficiency** in the composition, in order to allow for slight variations in manufacture, is a fairly liberal one, amounting to 5 per cent. of the total nitrogen or of potash certified to be present, if the fertiliser contains not less than 10 per cent. of nitrogen or potash, and 7 per centum of the total phosphoric acid certified to be present, if the contents of phosphoric acid are not under 15 per cent. In the case of fertilisers containing smaller amounts of fertilising ingredients, less than 10 per cent. of nitrogen or potash, and less than 15 per cent. of phosphoric acid, the amounts of deficiency allowed are—nitrogen and potash $\frac{1}{2}$ per cent., and phosphoric acid 1 per cent.

On the whole, it may be stated that the composition of the fertilisers agrees fairly well with the guaranteed amounts, which, for this reason, are not given on the table.

Hitherto great confusion has existed through stating the composition of fertilisers in various ways, giving, for instance, phosphoric acid as bone phosphate, tricalcic phosphate; nitrogen as ammonia and ammonium sulphate; potash as potassium sulphate and potassium chloride, &c. All such statements only mislead the farmer, and to avoid this, the Act provides for the statement of the valuable fertilising ingredients in percentage amounts of nitrogen (N), potash (K_2O), and phosphoric acid (P_2O_5).

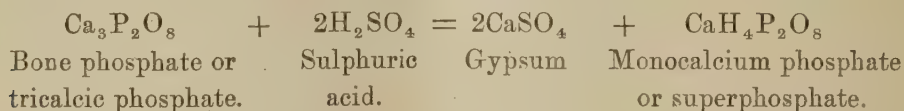
The conversion of the amount of one compound into another is very simple, and as many manuring formulæ contain the old denominations, I will repeat here a table for such conversion which appeared in my 18th Lesson on the Chemistry of the Farm, Dairy, and Household:—

Amount of—				Multiplied by	Gives the Corresponding Amount of—	
Ammonia	...	...	...	NH_3	0·824	Nitrogen, N
Ammonium sulphate	...	...	...	$(\text{NH}_4)_2\text{SO}_4$	0·212	
Sodium nitrate (Chili saltpetre)	...	...	...	NaNO_3	0·165	
Potassium nitrate (saltpetre)	...	...	...	KNO_3	0·139	
Nitrogen	...	...	...	N	1·214	Ammonia, NH_3
Nitrogen	...	...	...	N	4·714	Ammonia sulphate
Potassium sulphate	...	...	...	K_2SO_4	0·541	Potash, K_2O
Potassium chloride	...	...	...	KCl	0·631	
Potassium nitrate	...	...	...	KNO_3	0·466	Potassium sulphate
Potash	...	...	...	K_2O	1·850	
Tricalcic phosphate	...	...	...	$\text{Ca}_3\text{P}_2\text{O}_8$	0·458	
Monocalcic phosphate	...	...	...	$\text{CaH}_4\text{P}_2\text{O}_8$	0·607	
Tetracalcic phosphate	...	...	...	$\text{Ca}_4\text{P}_2\text{O}_9$	0·391	Citrate soluble } Phosphoric acid, P_2O_5
Limestone, marble	...	...	...	CaCO_3	0·560	
Gypsum	...	...	...	CaSO_4	0·411	Lime, CaO

It will be noticed in this table, and also in the table of analyses, that phosphoric acid appears under three different headings—water soluble citrate soluble, and citrate insoluble phosphoric acid. A short explanation of these terms will not be out of place.

In bones, and in most of the mineral phosphates, phosphoric acid exists in combination with lime, in the form of a calcium phosphate: **Tricalcic phosphate**, which is insoluble in water and in citric acid solutions, but soluble in mineral acids. On account of this insolubility the action of bone manure and mineral phosphates is exceedingly slow, and may extend over many years. The finer the bones or the phosphates are crushed or powdered the quicker will be the action, and for this reason the fineness of the bone meal is of importance, and should be stated.

When strong sulphuric acid is allowed to act on this insoluble tricalcic phosphate, part of the lime combined with the phosphoric acid is withdrawn, lime sulphate or gypsum being formed and the phosphoric acid is left in the form of **monocalcium phosphate**.



This new compound is soluble in water, and therefore readily available to the plants, but on account of the special process of manufacture it is the most expensive form of phosphoric acid in our fertilisers. The superphosphate is generally manufactured from steamed bones, bone ash, and mineral phosphates. Mineral phosphates containing a high amount of iron or alumina are not suitable for the manufacture of superphosphates, because these bases readily recombine with this acid phosphate, to form again insoluble phosphates, called reduced or reverted phosphates. A similar change would take place if lime were added to superphosphate, and also in soils containing a large amount of lime, a **dicalcium phosphate**, $\text{Ca}_2\text{H}_2\text{P}_2\text{O}_8$, may be formed, which is insoluble in water, but soluble in citric acid solutions. Another form of a lime phosphate is found in basic slag or Thomas phosphate—namely, **tetracalcium phosphate**, $\text{Ca}_4\text{P}_2\text{O}_9$, which also is insoluble in water, but soluble in saline

solutions, particularly such which contain salts of citric acid. These last two compounds are, therefore, classed as citrate soluble phosphoric acid, which is fairly readily absorbed by the plant roots, and, therefore, comes close in its value to the water soluble phosphoric acid. Basic slag is an artificial product, and should be ground as fine as possible, and a good sample of this fertiliser should nearly all pass through a sieve having 100 meshes to the linear inch. Thomas phosphate is one of the cheapest and best sources to supply phosphoric acid; it is of particular value to sour lands, deficient in lime but rich in humus.

The amount of citrate soluble phosphoric acid is generally determined in basic slag only; and in many instances the phosphoric acid, given as citrate insoluble in the accompanying table of analyses, may contain small amounts of citrate soluble phosphoric acid.

Nitrogen is the most expensive of all the fertilising ingredients of a manure, and is chiefly supplied in form of nitrate nitrogen, as in Chili saltpetre, or in form of ammonia salts, as in ammonium sulphate, or in form of organic nitrogen, as in blood, meatworks manure, &c. Nitrate of soda is a very quick-acting manure; nitrogen in the form of nitrate is in the most available form, but nitrates are not readily retained or absorbed by the soil, and therefore liable to be washed away by heavy rains. Nitrogen in ammonium sulphate is not in such an available form, as it has to be changed into nitrates by the process of nitrification. Favourable conditions and lime salts are necessary for this process, and in soils very deficient in lime this manure, therefore, may give poor or no results. Ammonium salts are retained and absorbed by the soil, and losses in the drainage water are not to be feared.

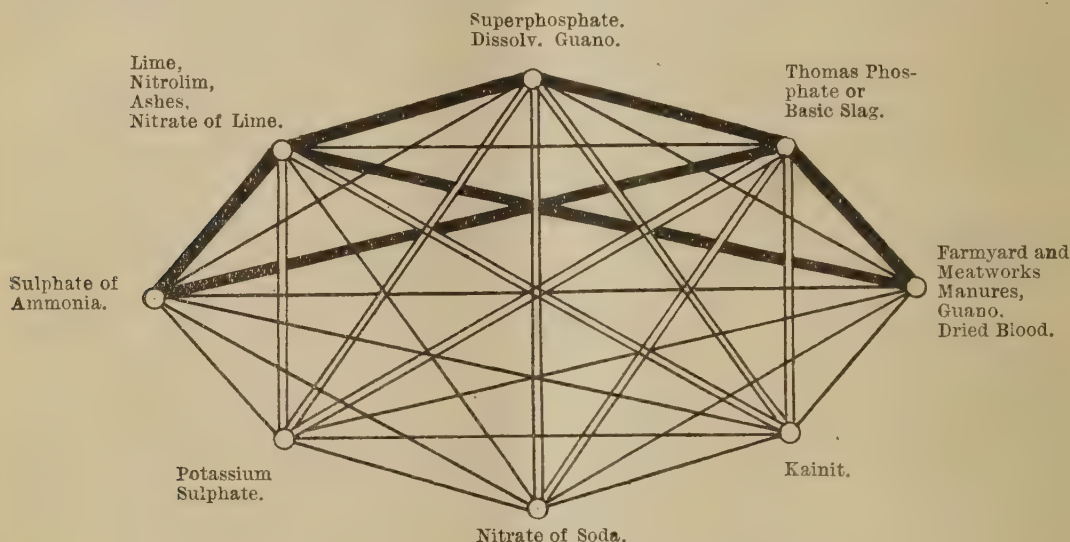
Of particular interest are the samples of **nitrate of lime**, and **nitrolim** or **calcium cyanamide**, of which large quantities are being imported.

These artificial fertilisers, which are really produced from nitrogen in the air, have given excellent results in a very large number of manuring trials, conducted the last three or four years, all over the world. I believe that our soils, of which a great number are rather deficient in lime, will derive particular benefit from these nitrogenous manures. The form of nitrogen in nitrolim is apparently nearly as available as the nitrogen of nitrates, much quicker in action than ammonia nitrogen, and not depending on the presence of lime in the soil. Nitrate of lime has the great advantage over nitrate of soda of not draining so easily through the soil. Nitrate of soda rather tends to exhaust soils, and spoils their physical conditions by depriving them of the lime, which faults are prevented by using nitrate of lime. Nitrolim is a very fine slate black powder, not liable to cake. As already stated, the action of this manure is only slightly slower than that of nitrates, and the large amount of lime (up to 50 per cent.) which it contains is in itself a great advantage. I believe that this new manure will prove of great value to our pineapple farmers and cane-growers.

Potash is generally used in the form of potassium sulphate. The chloride and kainite are as a rule not so suitable to our soils.

In studying the composition of the mixed fertilisers on the table of analyses, it will be noticed that in most of them the amounts of phosphoric acid are rather high as compared with the amounts of nitrogen and potash. For this reason I generally recommend farmers to make their own mixtures from the pure concentrated manures, according to the requirements of their soil and crops.

When mixing fertilisers together, such mixtures must be avoided which would lead to decomposition, which, for instance, would take place if ammonium sulphate was mixed with lime or with Thomas phosphates, superphosphate with lime; or which may cause caking, like mixing kainite with Thomas phosphate. A very simple guide for the mixing of manures is given in the accompanying diagram, devised by Dr. Geckens, which I slightly modified, however, to apply to our local conditions.



Manures joined by a heavy black line should *never be mixed* together; those connected by a double line must only be *mixed immediately before use*; and those joined by a thin single line may be *safely mixed together at any time*.

It is a matter of extreme difficulty to fix the monetary value of a manure, as so many factors influence the value. Cost of manufacture and mixing, bagging, rebagging, labelling, loss during storages, deterioration and decomposition on keeping, carriage and freight, &c., have to be taken into consideration. Again, in many cases the value derived from the chemical composition does not represent the actual value of the fertiliser, which depends upon many causes, local conditions and requirements.

Some method of comparison is absolutely necessary, and for this purpose it is customary to use unit values, which are the cost price of 1 per cent. per ton of the various fertilising constituents, or actually the cash value of 22.4 lb. of each ingredient. For instance, in a sulphate of ammonia costing £15 per ton, containing 20.68 per cent. of nitrogen, the

unit value of nitrogen would be $\frac{15 \times 20}{20.68} = 14.5s. = 14/6$.

The following unit values were approximately fixed for the calculation of the manurial value per ton in Brisbane:—

						s.	d.
Nitrogen	...	{	as nitrate	...	...	16	0
			in ammonium salts	...	...	14	6
			in blood, fine bone, &c.	...	...	14	6
Potash	...	{	as sulphate	...	...	5	6
			as chloride	...	...	5	0
Phosphoric acid	{	water soluble	...	...	...	5	3
		citrate soluble	...	...	...	4	0
		Insoluble as in fine bones	...	...	...	3	0

As an example, we will calculate the value of the mixed fertiliser No. 1202, Shirley's No. 5 Manure, which is supposed to contain 12 per cent. water soluble phosphoric acid, 3.3 per cent. nitrogen, and 7 per cent. potash. From the analysis we find that it contains 12.43 per cent. water soluble phosphoric acid, .27 per cent. insoluble phosphoric acid, 6.66 per cent. potash, and 2.96 per cent. nitrogen, and the value per ton is, therefore, as follows:—

N	2.96	×	14s. 6d.	=	42.92s.
K ₂ O	6.66	×	5s. 6d.	=	36.63s.
Water sol. P ₂ O ₅	12.43	×	5s. 3d.	=	65.28s.
Insol. P ₂ O ₅	.27	×	3s. 0d.	=	.81s.

145.64s. = £7 5s. 8d.

The advertised price of this manure is £8 per ton in Sydney.

On the whole, it may be stated that these comparative manurial values fairly well represent the market value, if the manures are purchased on a large scale. It is, of course, quite impossible to get manures in small lots of 1 or 2 cwt. at this price, particularly such manures as superphosphate and nitrate of soda, which require frequent rebagging.

Farmers have the means in their own hands to obtain cheap and reliable fertilisers—they simply have to co-operate and order large quantities, a few months ahead, and in this case the fertilisers will be obtained just as cheaply here in Brisbane as in Sydney or Melbourne.

Of course, for our Western and Northern farmers the freight on manure will considerably raise the cost, but even in these cases considerable saving will be effected on ordering large quantities, and all manure vendors will make special quotations for such orders.

In order to encourage the use of fertilisers, and more particularly to induce experimenting on the part of our agriculturists, I give herewith a table of the approximate manurial requirements of various crops in lb. per acre:—

MANURIAL REQUIREMENTS IN LB. PER ACRE.

	Nitrogen.	Phosphoric Acid.	Potash.	Lime.
Bananas	30—60	50—80	30—160	56
Barley	20—40	20—53	50—95	30
Barley, Brewers'	15—20	30—65	60—95	30
Beans	0—27	20—56	75—130	70
Cabbages	100—200	50—70	50—150	150
Carrots	50—70	15—25	40—75	56
Cauliflowers	100—150	30—50	30—60	56
Citrus Fruit	40—80	30—40	40—80	40
Corn	20—80	20—53	50—110	30
Cotton	20—30	30—60	15—30	70
Cucumbers	30—56	20—36	50—72	20
Lucerne	0—10	40—70	65—100	140
Mangolds	50—80	30—70	100—160	56
Meadowlands	50—75	20—30	80—110	40
Onions	60—81	20—36	50—80	56
Peas	0—13	20—56	56—100	70
Pineapples	50—75	50—75	100—150	70
Potatoes	20—53	20—50	67—100	30
Rape	50—70	40—70	60—80	80
Sisal Hemp	10—20	20—40	50—70	50
Sorghum	30—100	30—60	70—150	30
Sugar-cane	30—80	20—60	50—100	50
Tobacco	50—140	50—90	80—150	70
Tomatoes	30—50	50—80	50—80	30
Turnips	90—112	20—33	100—150	80
Wheat	10—40	15—56	20—65	30

From this table the necessary amounts of fertilisers to be applied per acre may be easily calculated. We take, for instance, Cabbages, which require a heavy application of manure, and wish to calculate the smallest amounts required per acre on an average class of soil.

The 100 lb. of nitrogen can be supplied by application of—

485 lb. of ammonium sulphate; or

790 lb. of dried blood; or

630 lb. of nitrate of soda.

The 50 lb. of phosphoric acid can be supplied by:—

280 lb. of superphosphate; or

200 lb. of bonemeal.

The 50 lb. of potash would be supplied by 100 lb. of sulphate of potash.

As a rule, in land under cultivation for some time, complete fertilisers, containing all the three principal plant foods, will be required; but, in some instances, one or the other may have to be considerably increased in order to get the best results. This can be generally ascertained by experimenting on a small scale, or a soil analysis may also give the required information. An excess of any particular plant food can be very harmful, and for this reason I follow with a table giving the amounts of artificial fertilisers to be applied to the various crops calculated for the small area of a square yard, and in the case of fruit trees for each tree:—

Experimental Manuring in Garden and Orchard.

Use the following artificial fertilisers in oz.
per square yard—

Cabbages, cauliflowers, lettuce, celery	{	Superphosphate	...	...	$1\frac{1}{4}$ to 2 oz.
		Sulphate of potash	...	...	$0\frac{1}{2}$ to 1 oz.
		Nitrolim	...	...	$1\frac{1}{4}$ to $2\frac{1}{2}$ oz.
		(or dried blood	...	...	$1\frac{3}{4}$ to $3\frac{1}{2}$ oz.)
Strawberries, tomatoes, potatoes, grass	{	Superphosphate	...	...	1 to $1\frac{1}{2}$ oz.
		Sulphate of potash	...	...	$0\frac{1}{2}$ to $0\frac{3}{4}$ oz.
		Nitrolim	..	...	1 to 2 oz.
		(or dried blood	...	...	$1\frac{1}{2}$ to 3 oz.)
Carrots, radishes, turnips, onions, shallots	{	Superphosphate	...	...	1 to 2 oz.
		Sulphate of potash	...	...	$0\frac{3}{4}$ to $1\frac{1}{4}$ oz.
		Nitrolim	...	...	$0\frac{3}{4}$ to $1\frac{1}{4}$ oz.
		(or dried blood	...	...	1 to $1\frac{3}{4}$ oz.)
Peas, beans, and other legumines	{	Superphosphate	...	...	2 to 3 oz.
		Sulphate of potash	...	...	1 to $1\frac{1}{2}$ oz.
		Nitrolim	...	...	0 to $0\frac{1}{3}$ oz.
Pineapples	{	Superphosphate	...	...	$1\frac{1}{2}$ to 3 oz.
		Sulphate of potash	...	...	2 to 3 oz.
		Dried blood	...	...	3 to 4 oz.
		(or nitrolim	...	...	$2\frac{1}{2}$ to 3 oz.)
Use per tree (small to large) in lb.—					
Oranges, mandarins, and lemons	{	Superphosphate	...	...	2 to 5 lb.
		Sulphate of potash	...	...	$1\frac{1}{2}$ to $3\frac{1}{2}$ lb.
		Nitrolim	...	...	3 to 9 lb.
		(or dried blood	...	...	5 to 14 lb.)
Deciduous trees, plums, apricots, etc.	{	Superphosphate	...	...	2 to 4 lb.
		Sulphate of potash	...	...	1 to 2 lb.
		Nitrolim	...	...	2 to 4 lb.
		(or dried blood	...	...	3 to 6 lb.)

In some cases the dried blood may replace the nitrolim or cyanamide in the manuring mixtures, and nitrolim again may be replaced by nitrate of lime, using the increased quantities given for dried blood.

For very young trees the quantities may be reduced, and for very large trees the quantities could be increased.

It is always better to apply the nitrolim and nitrate of lime separately, as a top dressing, a week or more after the application of the other manures.

The effect of all artificial fertilisers will be very much increased if small quantities of **stable manure** can be applied at the same time. The presence of organic matter in the form of **humus** is of the greatest importance to keep up the fertility of a soil; and in a loose, well-worked soil the manures are always more effective.

When we consider the functions of the various plant-foods, it may be stated as a general rule that potash, which is found most abundantly in young leaves and twigs of plants, is intimately connected with the production of starch, sugar, and other carbohydrates in the leaves, and subsequent transference of these bodies to the fruits. Part of the potash is generally returned back to the soil after it has done its work in the plant.

Nitrogen promotes the growth of leaves and stems, and rather retards maturity and development of buds and flowers. The leaves show generally a deep green colour, and the whole of the plant becomes more vigorous in its growth by the application of nitrogenous manure. The amount of nitrogen in the plant itself and corresponding amounts of proteins are generally increased.

Phosphoric acid has a rather ripening effect on plants. Phosphates are generally found in the seeds, partly in association with the proteins and partly associated with fats, more particularly in Lecithin, a highly nutritious fatty compound, found in many seeds. No plant would produce seeds unless a sufficient quantity of phosphoric acid in the form of phosphates is present in the soil.

Lime aids in decomposition of organic matters, and also converts many compounds into a more available form. Its chief action, however, is to improve the physical condition of soils, particularly loosening heavy clay soils, and also, again, giving body to light sandy soils. Lime also counteracts any acidity produced by decaying vegetable matters.

ANALYSES OF FERTILISERS.

TAKEN AND ANALYSED UNDER "THE FERTILISERS ACT OF 1905."

Number of Analysis.	Fertiliser.	Where Obtained.	Moisture.	PHOSPHORIC ACID P_2O_5 .				Potash, K_2O .	Nitrogen, N.	Comparative Manurial Value per Ton.	Remarks.
				Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.				
			%	%	%	%	%	%	%	£ s. d.	
Simple Fertilisers : Potash Manures.											
633	Sulphate of Potash ...	Webster and Co., Brisbane ...	3.85	...	...	...	...	50.60	...	13 18 0	93.60 per cent. Sulphate of Potash
1022	Ditto ditto ...	ditto ditto ...	.30	...	...	...	...	52.80	...	14 9 2	97.60 ditto
1187	Ditto ditto ...	ditto ditto ...	.49	...	...	...	...	49.20	...	13 11 0	91.10 ditto
1375	Ditto ditto ...	ditto ditto ...	1.26	...	...	...	...	52.60	...	14 8 0	97.40 ditto
570	Ditto ditto ...	Finlayson, Maryborough ...	.11	...	...	...	...	53.20	...	14 12 5	98.40 ditto
1193	Ditto ditto (Shirley's) ...	Paul and Gray, Brisbane ...	.53	...	...	...	...	51.65	...	14 4 0	95.60 ditto
1222	Ditto ditto ...	H. A. Petersen, ditto ...	1.96	...	...	...	...	51.35	...	14 2 2	95.05 ditto

Simple Fertilisers : Nitrogenous Manures.

Number of Analysis.	Fertiliser.	Where Obtained.	Moisture.	PHOSPHORIC ACID P_2O_5 .				Potash, K_2O .	Nitrogen, N.	Comparative Manurial Value per Ton.	Remarks.
				Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.				
			%	%	%	%	%	%	%	£ s. d.	
Simple Fertilisers : Nitrogenous Manures.											
632	Sulphate of Ammonia ...	Webster and Co., Brisbane ...	1.55	...	...	...	...	...	20.21	14 13 2	95.00 per cent. Sulphate of Ammonia
1021	Ditto ditto ...	ditto ditto ...	.83	...	...	...	...	...	20.82	15 1 0	98.00 ditto
1189	Ditto ditto ...	ditto ditto ...	4.07	...	...	...	...	...	19.78	14 7 0	93.00 ditto
372	Ditto ditto ...	South Brisbane Gas Co. ...	2.31	...	...	...	...	...	20.05	14 17 1	94.40 ditto
1191	Ditto ditto (Shirley's) ...	Paul and Gray, Brisbane ...	.18	...	...	...	...	...	20.56	14 18 0	96.60 ditto
1223	Ditto ditto ...	H. A. Petersen, ditto ...	.63	...	...	...	...	...	19.43	14 2 0	91.50 ditto
1572	Ditto ditto ...	Brisbane Gas Co. ...	.66	...	...	...	...	...	20.93	15 3 8	98.60 ditto
631	Nitrate of Soda ...	Webster and Co., Brisbane ...	1.00	...	...	...	...	...	16.00	12 16 0	97.00 ditto
1190	Ditto ditto ...	ditto ditto ...	1.01	...	...	...	...	...	16.20	12 19 4	98.20 ditto
1205	Ditto ditto (Shirley's) ...	Paul and Gray, ditto ...	.87	...	...	...	...	...	16.11	12 18 0	97.60 ditto
1226	Ditto ditto ...	H. A. Petersen, ditto ...	2.67	...	...	...	...	...	15.39	12 6 3	93.20 ditto
1023	Nitrate of Lime ...	Trackson Bros., ditto ...	...	...	...	...	...	...	12.90	10 6 4	25.80 ditto
634	Nitrolim ...	ditto ditto ...	1.75	...	...	...	...	...	15.80	12 13 0	Lime (CaO)
1475	Ditto ...	ditto ditto ...	.58	...	...	...	...	...	16.26	13 0 3	

Bone, Blood, Meatworks Manures, &c.

	Bone Meal (Baxter's)	Finlayson, Maryborough	6-30	...	24-20	24-20	3-33	6 1 1	Coarse, 76 p. cent.; fine, 24 p. cent.
572	Ditto	Queensland Fertiliser Co., Runcorn	9-57	...	21-85	21-85	4-25	6 7 1	Coarse, 76 p. cent.; fine, 24 p. cent.
799	Bone Dust	Ditto	7-13	...	23-69	23-69	3-53	6 2 2	Coarse, 76 p. cent.; fine, 24 p. cent.
1221	Ditto (Q.F. Co.)	T. Wood, Brisbane	6-91	...	23-84	23-84	3-50	6 3 7	Coarse, 74 p. cent.; fine, 26 p. cent.
1228	Ditto	Summerlin, Brisbane	7-43	...	20-48	20-48	4-13	6 1 4	Coarse, 86 p. cent.; fine, 14 p. cent.
1229	Ditto	J. O. Schupp, Mackay	11-00	...	24-32	24-32	2-74	5 12 7	
716	Bone Manure	Finlayson, Maryborough	6-58	...	18-91	18-91	4-64	6 4 0	
568	Fertiliser (Lakes Creek, C.Q.M.E.)	C.Q.M.E., Lake's Creek	7-93	.42	19-10	19-52	3-88	6 14 9	
1179	Fertiliser (Fitzroy)	Burdekin R. Meat Preserving Co.	6-00	...	11-79	11-79	4-49	5 0 6	
656	Ditto	Torrens Creek Meat Export Co.	3-85	...	18-33	18-33	3-37	5 3 11	
695	Ditto	Ditto	7-36	...	17-20	17-20	3-48	5 2 1	
787	Ditto	Birt and Co., Brisbane	3-96	...	18-66	18-66	4-79	6 5 5	
1150	Ditto	Q.M.E. and A. ditto	5 04	...	12-65	12-65	7-02	6 19 8	
1213	Ditto	Baynes Bros. ditto	3-80	...	23-47	23-47	3-58	6 2 0	
1264	Ditto	E. Gleeson, Stanthorpe	9-83	.43	17-77	18-20	4-57	6 0 11	
1209	Ditto (Baynes Bros.)	G. Searle and Sons, Toowoomba	11-28	.47	18-41	18-88	4-13	5 16 9	
1210	Ditto	J. C. Hutton Propy. Ltd., Brisbane	15-35	...	12-86	12-86	5-22	5 14 2	
1281	Ditto	Ditto	17-95	1-87	7-60	10-70	6-88	6 17 0	
1328	Ditto	Aplin, Brownand Crawshaw, Brisbane	8-46	.28	12-63	12-91	7-02	7 0 8	
1505	Ditto (Gladstone works)	Bergl Australia, Bowen	9-70	...	18-72	18-72	3-05	5 0 5	
1050	Ditto ("Hashnagandy")	N.Q.M.E., Alligator Creek	5-10	...	18-46	18-46	5-20	6 10 8	
352	Fertiliser	Webster and Co., Brisbane	18-70	...	...	...	11-92	8 13 0	
636	Dried Blood	Ditto	21-40	...	...	...	11-77	8 10 10	
1019	Ditto	Torrens Creek Meat Export Co.	4-85	...	...	...	12-65	9 2 0	
694	Ditto	Birt and Co., Brisbane	11-56	...	...	...	11-58	8 8 0	
1149	Ditto	Ditto	15-20	...	...	...	11-97	8 13 6	
1318	Ditto	Q.M.E. and A., Brisbane	14-80	...	...	...	11-94	8 12 4	
1212	Ditto	Bergl Australia, Bowen	23-70	...	...	...	11-29	8 2 6	
1049	Ditto			...	...	...			

Mixed Fertilisers, Superphosphates, &c.

629	Superphosphate	...	...	Webster and Co., Brisbane	...	13-95	17-00	.76	17-76	...	...	4	12	9	
1020	Ditto	...	...	Ditto	...	16-12	16-12	.93	17-05	...	...	4	8	9	
1186	Ditto	...	...	Ditto	...	12-13	16-46	1-51	17-97	...	...	4	12	6	
1436	Ditto	...	...	Aplin, Brown and Crawshaw, Brisbane	...	10-60	17-94	.72	18-66	...	...	4	17	6	
1203	Ditto	...	...	Paul and Gray, Brisbane	...	8-74	18-42	.29	18-71	...	...	4	18	8	
1211	Ditto	...	...	W. Jones and Sons, Toowoomba	...	10-03	17-80	.71	18-51	...	...	4	16	9	
1224	Ditto	...	...	H. A. Petersen, Brisbane	...	10-93	13-51	1-21	14-72	...	...	3	15	9	
571	Basic Slag	...	...	Finlayson, Maryborough	...	.33	...	2-87	9-04	...	...	1	18	7	70 per cent. fine.
635	Ditto	...	...	Webster and Co., Brisbane	...	.50	...	8-70	6-26	...	...	2	13	7	85 per cent. fine.
11188	Ditto	...	...	Ditto	...	.36	...	7-65	5-97	...	...	2	8	6	84 per cent. fine.
11192	Shirley's No. 0	...	...	Paul and Gray	...	1-81	Nil	7-06	8-44	6-05	2-24	2	10	4	

ANALYSES OF FERTILISERS—continued.
TAKEN AND ANALYSED UNDER "THE FERTILISERS ACT OF 1905."

Number of Analyses.	Fertiliser.	Where Obtained.	Moisture.	PHOSPHORIC ACID P ₂ O ₅ .				Potash, K ₂ O.	Nitrogen, N.	Comparative Manurial Value per Ton.	Remarks.
				Water Soluble.	Citrate Soluble.	Citrate Insoluble.	Total.				
Mixed Fertilisers, Superphosphates, &c.—continued.											
11198	Shirley's No. 2	Ditto	11.49	15.00	.41	15.41	1.19	1.35	5 7 1		
11197	Ditto No. 3	Ditto	9.08	14.52	.09	14.61	2.11	2.32	6 2 9		
1206	Ditto No. 3	Lawson & Co., Toowoomba	5.25	12.12	.15	12.27	2.63	2.38	5 13 8		
630	Ditto No. 5	Paul & Gray, Brisbane	8.40	11.80	.55	12.35	5.40	2.67	6 12 9		
1202	Ditto No. 5	ditto	8.92	12.43	.27	12.70	6.66	2.96	7 5 8		
1207	Ditto No. 5	Lawson & Co., Toowoomba	5.74	11.74	.16	11.90	6.84	3.12	7 5 7		
1225	Ditto No. 5	H. A. Petersen, Brisbane	8.52	12.75	.58	13.33	6.63	3.12	7 11 4		
11196	Ditto No. 7	Paul & Gray, ditto	8.33	13.48	.42	13.90	4.09	1.57	5 18 1		
1204	Ditto No. 9	ditto	3.86	8.01	.91	8.92	4.52	4.03	6 9 1		
11195	Ditto No. 11	ditto	7.10	11.21	1.49	12.70	8.30	nil	5 10 3		
1208	Ditto No. 11	Lawson & Co., Toowoomba	6.62	11.42	.25	11.67	8.33	nil	5 7 1		
11194	Ditto No. 14	Paul & Gray, Brisbane	3.22	5.83	.52	16.33	5.52	2.04	6 3 0		
1201	Ditto No. 19	ditto	2.95	3.86	1.60	11.57	2.36	3.56	5 9 9		
11199	Ditto F. S. D. Cane Fertiliser	ditto	2.01	8.96	.31	9.27	6.37	7.58	9 13 6		
1200	Ditto Special ditto	ditto	1.53	6.06	.44	6.50	7.85	10.57	11 10 4		Nitrogen much higher than guaranteed
1227	Canary Guano	H. A. Petersen, ditto	11.76	7.07	2.17	9.24	1.57	4.25	5 15 4		
911	Cane Fertiliser	Mossman Central Mill	5.47	...	...	7.47	9.15	9.56	10 11 5		Containing N. as Sulphate of Ammonia 6.15 per cent., Organic N. 3.41 per cent.
107	Cereal Guano	Webster & Co., Brisbane	10.48	7.38	4.40	11.78	2.32	3.48	5 16 2		
103	Crown A Fertiliser	ditto	11.18	13.25	2.97	16.22	8.31	nil	6 3 7		
105	Ditto B	ditto	10.48	11.08	3.09	14.17	8.12	3.46	5 17 7		
108	Ditto C	ditto	5.77	8.10	1.20	9.30	12.40	6.18	10 3 11		
216	Ditto M	ditto	8.16	8.13	4.47	12.60	2.23	3.60	6 0 9		
323	Mt. Lyall Root Crop No. 1	Mourilyan Syndicate Ltd.	12.98	2.49	6.79	9.28	6.66	2.59	5 7 8		
322	Ditto	ditto No. 2	10.85	8.52	4.93	13.45	8.15	1.40	6 4 5		

General Notes.

CITRONELLA OIL AND BACKHOUSIA CITRIODORA.

Citronella oil is an article in large demand in the manufacture of soap, geraniol, and also of fresh grease for the re-extraction of the perfume in the form of an essence by means of the "Enfleurage" process. The oil is distilled in many countries, especially in Ceylon, from the Lemon Grass (*Andropogon schænanthus* and *A. nardus*). In Ceylon there are two forms of citronella grass—the wild and the cultivated. The former, *A. nardus*, known also as Java grass, occurs on large tracts of uncultivated country in the interior of Ceylon up to 5,000 ft. above sea level. The cultivated variety is *A. citratus* or *A. schænanthus*. The leaves and roots may be kept for a long time without losing their virtue.

Richer in "citral," however, than the lemon grass of either Java or Ceylon is the Queensland Eucalyptus (*Backhousia citriodora*), which is plentiful in many parts of Queensland, notably in the scrubs of the Blackall Range and at Gladstone. A sample of the oil from the leaves of this tree was prepared in 1904 by the then Assistant Colonial Botanist, Mr. J. F. Bailey. The sample weighed about 2 lb., and was forwarded to the Imperial Institute in London for analysis and report. The amount of citral in the oil was found to be 93.5 per cent. This shows that this Queensland oil is one of the richest known sources of the odorous substance citral, since the East India and Ceylon lemon-grass oil, the principal sources of citral outside of Java, contain only 70 to 80 per cent. of this material. In a letter addressed by a firm of analytical chemists in London to the "Chemist and Druggist," the latter say:—

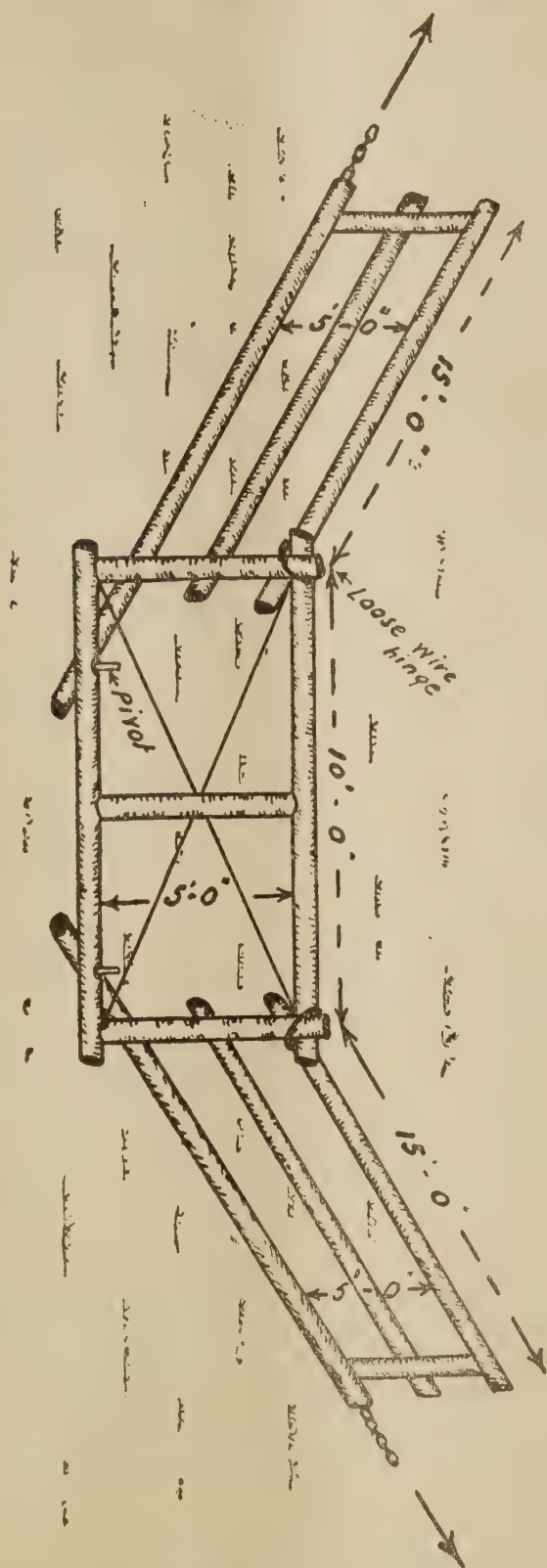
"*Java Lemon-grass Oil*.—We have examined several samples from the 'Aromatica' factory, and find the citral-content varied from 70 to 78 per cent. The oils compare most favourably with Perak and Ceylon oils, having a rather cleaner odour and yielding sweet-smelling citral. They are, however, not so soluble as the oils previously mentioned."

"*Backhousia Citriodora Oil*.—At present this is unobtainable. We received several large shipments of it some years back, and found the citral-content as high as 98 per cent.; but as a general rule it varied from 96 to 97 per cent. by the absorption method. As already stated, we have been advised that it is impossible to distil the oil in the basis of the prices that are offered. We have not had any shipments for eighteen months; and *Backhousia citriodora* oil, therefore, cannot be considered as a serious commercial competitor of Java or Ceylon lemon-grass oil."

On Mr. Bailey's oil being submitted for commercial valuation to two London firms dealing in volatile oils, one firm stated that the oil would be worth as much as the purest lemon-grass oil (which is generally adulterated)—viz., about 7d. per oz. c.i.f. London; whilst another firm was of opinion that it would be saleable in London at 9d. or 9½d. per oz. If oil such as can be distilled in Queensland, containing 96 to 97 per cent. of citral, as above stated, could be regularly placed on the market, it is highly probable that the higher price could be secured. But, under present labour conditions, it seems hopeless to exploit any such industry in this State. The demand for citronella oil from India is very considerable, and the annual export from the Malabar Coast amounts to about 3,000 cases or 6,000 gallons.

A HOME-MADE HAY COLLECTOR.

To save time and labour in the busy season, is to save and make money. Hay collectors are costly, as a rule; but the pattern shown in the accompanying illustration made out of rough native wood, with the



help of a few bolts and a little wire, is cheap and effective. It runs as a sled over the grass stubble, the central portion or back resting on pivots

on the arms, which swing in or out to any desired width. This arrangement (says the "Rhodesian Agricultural Journal") is in use on a farm near Salisbury. The swathes as left by the mower are gathered into windrows by the horse rake. This collection is then drawn along by animals attached at the point of draft indicated by the arrows, and gathers the hay in front of it, and conveys it to the side of the stack, on to which it may be lifted by hand or by mechanical forks or spears and a derrick. Large quantities are thus expeditiously handled, and the labour of loading and off-loading a wagon for conveyance for a short distance is dispensed with.

TO ESTIMATE THE HORSEPOWER OF A STREAM.

First, estimate the number of cubic feet flowing in the stream per minute. Then multiply this number by the weight of each individual cubic foot in pounds. This, again, is multiplied by the distance the water has to fall; and the total is divided by 33,000, giving the approximate horse power. There are numerous streams in the Cairns, Atherton, Babinda Creek, and other Northern districts where water power can be and has been substituted for steam engines or horse gear. The above calculation may be useful to farmers in these districts.

PLANTAIN MEAL.

In Dominica plantain meal is universally used by the poorer classes in the Republic as an article of food; but it is only made in small quantities for home consumption, and none is found in the markets. The meal is easily made, is of rich flavour, and is said to be an excellent substitute for wheat flour. The fruit is gathered green, peeled, sliced, dried three days in the sun and is then pounded in a mortar and sifted. Ten plantains yield 1 lb. of rich, creamy meal, redolent of orris root. It is commonly prepared as a kind of porridge, though it is sometimes made into cakes and served with cream.

TO PROTECT STEEL FROM RUST.

Polished steel may be protected from rust by the application of the following compound:—Lard, 6 parts; resin, 1 part. Melted together, the two ingredients are stirred until cold. The resin prevents the mass from becoming rancid, and also acts as an air-tight film. If rubbed on a polished steel surface, it effectually preserves and protects the polish, and is easily removed by gasoline or kerosene.

The "Scientific Australian," which gives the above recipe, also tells

HOW TO PRESERVE WOODEN POSTS.

A farmer, many years ago, discovered that wood can be made to last longer than iron in the ground. Time and weather seemed to have no effect on the timber. The posts can be prepared for less than 1d. each. This is the recipe: Take boiled linseed oil and stir in pulverised coal till the mixture has the consistency of paint. Then apply.

Animal Pathology.

TAPE WORMS IN SHEEP AND LAMBS.

By A. H. CORY, M.R.C.V.S., Government Veterinary Surgeon.

Symptoms.—Eight varieties of tapeworms are known to infest the bowels of sheep. Lambs will not fatten when harbouring these worms, they become unthrifty, hidebound, and the wool is hard and poor in quality. The animals appear stiff when moving, and generally hang behind the flock when being driven.

Tapeworms produce emaciation with paleness of the mucous membrane of eyes, nose, mouth, &c. The function of the digestive organs is impaired, the cud being chewed irregularly, breath unpleasant, occasional colic, tympany of abdomen, diarrhoea with mucous in which is frequently found segments of the tape worms. The sheep ultimately die from poverty and exhaustion.

Prevention.—Prevention consists in draining damp land, stagnant water holes, &c., and by keeping uninfested sheep from known infested pastures. Infested pastures should, where practicable, be ploughed or dressed with salt, lime, or sulphate of iron, allowing about $\frac{1}{2}$ cwt. per acre. Avoid overstocking.

Treatment.—For treatment of 6 months old lambs. Fast animals for 8 or 12 hours, and give the following:—

Oil of Turpentine	1 drachm.
Powdered Areca nut	25 grains.
Extract of Male Fern	15 drops.
Linseed Oil	1 oz.

Repeat the dose once weekly for three weeks. Increase the dose according to age of animal.

Where it is not practicable to drench sheep, 25 to 60 grains of Areca nut (according to size of animal) should be given to each sheep, on two or three occasions, mixed in some bran or other food.

A lick composed of one part sulphate of iron to eight parts of salt, should be available to sheep in troughs, allowing about half an ounce for each adult sheep.

Answers to Correspondents.

THE KOLA NUT.

“TROPICAL FRUIT-GROWER,” Cooktown—

The kola-nut tree has somewhat the appearance of a small thick-set mango tree. It begins to bear in its native country, in West Coast of Africa, in the fourth or fifth year, and is in full bearing in the tenth. The nuts are borne in pods about 6 in. in length, each containing from 4 to 6 seeds. Kola trees are said to have borne as much as 120 lb. of marketable nuts annually; but, from authentic accounts, the yield appears to be about 200 nuts, worth to-day in the market 1d. each. There are kola-nut trees at the Kamerunga State Nursery, at Cairns, which bore their first nuts in the tenth year. Then the big drought occurred, and they only began to bear fruit again in the fourteenth year. See Vol. XV. “Queensland Agricultural Journal,” p. 837, April, 1905; and then write to Mr. Newport, Instructor in Tropical Agriculture, Kamerunga.

DESTRUCTION OF HYBERNATING INSECTS—BLACK SPOT IN GRAPES, Etc.

P. NEWTON, Bundaberg.—

1.—*Perchloride of Mercury for Hybernating Insects—*

Messrs. Taylor and Colledge have a properly prepared formula for this purpose. Write them for quotation.

2.—*Cooper's Apterite or Soil Fumigant—*

Has not been tried on the State Farms. The perchloride will be found the best.

3.—*Black Spot on Grapes—*

Black spot is always liable to recur in wet seasons. The best treatment is the sulphuric acid wash in spring, which should be followed by several sprayings with Bordeaux mixture during the growing season. The formula for acid wash is as follows:— $\frac{3}{4}$ -pint of sulphuric acid to 1 gallon of water. Apply to all parts of the vine with a swab when the sap is rising, but before the buds have burst.

4.—*Sulphuring Vines for Mildew—*

The best time to sulphur the vines is whilst the dew is on the foliage.

5.—*Manuring Vines One Year Old—*

It is not necessary to manure young vines if they are vigorous. Manure abundantly when bearing.

6.—*Charcoal Dust for Manuring Vines—*

Use 4 or 5 lb. of animal charcoal per vine in early spring in addition to 2 or 3 lb. of a good potassic fertiliser.

UNFRUITFUL BANANAS.

W.F.S., Mount Coolum.—

The unfruitfulness of bananas is often a result of over-exuberant growth. The plant will bear properly after the excessive growth has steadied down. Use about 4 or 5 lb. of potash manure to each plant. Apply to Messrs. Webster and Co., Brisbane, for their best potash fertiliser.

ROSELLA WINE.

J. THOMAS, Esq., Stanwell.—

Put your fruit into a cask that has one head out. Pour boiling water over the fruit, rather more than enough to cover it. Let this stand for about three days. Stir now and again. At the end of three days, strain the liquor into another cask, with both heads in. Then for every gallon of liquor, take 3 lb. of sugar and make a good thick syrup of the same. Pour this into the liquor while hot, and stir well. Leave the cask with the bung out until fermentation starts. Should this not occur, say, within twenty-four hours, add a bottle of yeast. Keep the cask in as even a temperature as possible, as this will help fermentation. In the process of fermentation, you will lose some of the liquor. Should it ferment thoroughly, save the liquor that overflows from the bung-hole, and put it back in the cask; but, should you find this not enough to keep your cask full, add a little warm water. When the liquor has almost finished fermenting—say, when it stands at 3 degrees density by the saccharometer—bung up the cask and leave for three months. Then bottle.

THE CULTIVATION OF RAPE.

J. E. KNIPE, Wooroolin.—

Rape, Dwarf Essex.—This should be sown now on a well-formed seed-bed, and preferably on a piece of land that has been well worked since removal of the last crop, and is in good tilth.

A seed drill is the most satisfactory method of sowing, care being taken not to sow more than 1 in. in depth. The quantity of seed per acre will vary according to the distance apart of the drills; 5 to 6 lb. of seed is sufficient when sown with a drill set to the usual width for drilling in wheat.

Better-grown and better-developed plants are obtainable by drilling in rows from 2 ft. to 2 ft. 6 in. apart, representing a minimum distance for the use of a horse hoe for after cultivation; 3 lb. of seed per acre will suffice for this width.

Failing a seed drill, a makeshift plan will do by running a number of drills out at one time with a marker, and then distributing the seed with a handy contrivance made by attaching a ½-lb. cocoa tin with a tight-fitting lid to a short stick almost at right angles to it by tying or riveting. The lid of the tin should, first of all, have 3 holes punched in it from the inside within a quarter of an inch of each other. A quick, jerky motion of the sower's hand and arm, as he walks along the drill, will deliver the seed in a satisfactory manner.

The size of the holes in the lid of the tin is gauged to allow of the passage through of one seed at a time freely.

Pigs may be grazed on the crop when the plants have made sufficient growth to make it worth while to cut or to graze them on it.

PRUNING VINES

Mrs. M. TWEED, Raglan.—

Allow two arms to each plant. Next August, prune each arm back to a length of from 2 to 3 ft., according to its vigour. Then two permanent arms will furnish side shoots next season, which must be pruned to two buds in the following winter.

WARTS ON MARE'S NECK.

Bog Cancer, *Mullet Creek*.—

The remedy is simple and effective. Make a loop in a piece of string; fasten it low down on the wart; tighten it; then, with a quick jerk, pull out the wart. It is not deep-seated, and if thus dealt with, the warts will not appear again. The trouble is not bog cancer.

MANURES FOR BANANAS AND CITRUS TREES.

ENOS NEWETT, Bundaberg—

For Bananas.—Blood manure gives good results. Another good manure is composed of 3 cwt. superphosphate, 2 cwt. sulphate of potash, and 1½ cwt. sulphate of ammonia per acre per annum. Best applied in two dressings.

For Citrus Fruits.—4 lb. bone dust, or blood and bone; 2 lb. superphosphate; 1 lb. to 1½ lb. sulphate of potash per tree.

Salt is not a manure in itself, but it improves the texture and fertility of the soil and assists the work of other manures.

The Markets.

PRICES OF FRUIT—TURBOT-STREET MARKETS.

Article.	APRIL.	
	Prices.	
Apples (Local), per case	2s. to 5s.	
Apples (Cooking), per case	4s. 6d. to 6s.	
Apricots, per case	...	
Bananas (Cavendish), per dozen	2½d. to 3d.	
Cherries, per quarter-case	...	
Bananas (Sugar), per dozen	2½d. to 3d.	
Custard Apples, per quarter-case	3s. to 4s.	
Grapes, per lb.	2½d. to 3d.	
Lemons, per case	2s. to 7s. 6d.	
Mangoes, per case	...	
Nectarines, per case	...	
Oranges, per case	1s. 6d. to 3s.	
Papaw Apples, per quarter-case	...	
Passion Fruit, per case	...	
Peaches, per case	...	
Pears, per case	6s. to 8s. 6d.	
Persimmons, per quarter-case	2s. to 3s.	
Plums, per case	3s. to 4s.	
Pineapples (Ripley), per dozen	6d. to 3s. 6d.	
Pineapples (Rough), per dozen	6d. to 3s. 6d.	
Pineapples (Smooth), per dozen	1s. 6d. to 4s.	
Tomatoes, per quarter-case	1s. 3d. to 1s. 6d.	
Watermelons, per dozen	...	

SOUTHERN FRUIT MARKET.

Apples (Local), choice, per case	7s. to 10s.
Apples (Cooking), choice, per case	3s. 6d. to 4s.
Apricots, per gin case	...
Bananas (Queensland), per bunch	1s. 8d. to 2s. 6d.
Bananas (Queensland), per case	7s. to 8s.
Bananas (N. Queensland), per bunch	2s. to 2s. 9d.
Bananas (Fiji), G.M., per bunch	3s. to 7s.
Bananas (Fiji), G.M., per case	14s. 6d. to 15s. 6d.
Cocoanuts, per dozen	2s. to 2s. 6d.
Grapes (N.S.W.), per half-case	2s. 6d. to 4s. 6d.
Lemons (N.S.W.), per gin case	6s. to 7s.
Mandarins, per gin case	6s. to 9s.
Mandarins (Queensland), Emperors, per gin case	...
Nectarines, per half-case	...
Oranges, per case	4s. 6d. to 8s.
Passion Fruit, per half-case	3s. 6d. to 5s.
Papaw Apples, per case	4s. to 5s.
Peaches, per gin case	3s. 6d. to 4s.
Peanuts, per lb.	5½d.
Pears, per gin case	4s.
Pears, per bushel-case	8s.
Persimmons, per half-case	2s. 6d. to 3s.
Pineapples (Queensland), common, per case	3s. 6d. to 5s.
Pineapples (Queensland), Ripley, per case	3s. 6d. to 5s.
Pineapples (Queensland), Queen's, per case	6s. to 7s.
Plums, per half-case	3s. to 4s. 6d.
Quinces, per gin case	2s. 6d. to 3s.
Rockmelons (N.S.W.), per gin case	2s. 6d. to 4s.
Tomatoes (N.S.W.), per half-case	2s. 6d. to 4s.
Watermelons, per dozen	2s. 6d. to 5s.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR APRIL.

Article.							APRIL.
							Prices.
Bacon, Pineapple ...	...	...	...	...	...	lb.	8½d.
Barley, Malting ...	...	...	...	...	...	bush.	...
Bran ...	...	...	...	...	...	ton	£5 2s. 6d.
Butter, Factory ...	...	...	...	...	...	lb.	7½d. to 7¾d.
Chaff, Mixed ...	...	...	...	...	...	ton	£2 10s. to £4
Chaff, Oaten (Victorian dumped)	...	...	...	...	...	"	£3 to £4
Chaff, Lucerne ...	...	...	...	...	...	"	£3 to £4
Chaff, Wheaten ...	...	...	...	...	...	"	£2 to £2 10s.
Cheese ...	...	...	...	...	...	lb.	3d. to 4d.
Flour ...	...	...	...	...	...	ton	£9
Hay, Oaten (Victorian) ...	...	...	...	...	...	"	£5 to £5 5s.
Hay, Lucerne ...	...	...	...	...	...	"	£2 10s. to £2 15s.
Honey ...	...	...	...	...	...	lb.	2½d. to 3d.
Maize ...	...	...	...	...	...	bush.	2s. to 2s. 1d.
Oats ...	...	...	...	...	...	"	3s. to 3s. 8d.
Pollard ...	...	...	...	...	...	ton	£5 2s. 6d.
Potatoes ...	...	...	...	...	...	"	£7
Potatoes, Sweet ...	...	...	...	...	...	cwt.	2s. 6d.
Pumpkins ...	...	...	...	...	...	"	2s. 3d. to 2s. 6d.
Pumpkins, Cattle ...	...	...	...	...	...	"	2s. 3d. to 2s. 6d.
Wheat, Milling ...	...	...	...	...	...	bush.	2s. 6d. to 3s. 6d.
Onions ...	...	...	...	...	...	ton	£4 5s. to £4 10s.
Hams ...	...	...	...	...	...	lb.	1s.
Eggs ...	...	...	...	...	...	doz.	1s. 2d. to 1s. 8d.
Fowls ...	...	...	...	...	...	pair	2s. 6d. to 3s. 6d.
Geese ...	...	...	...	...	...	"	5s. to 6s.
Ducks, English ...	...	...	...	...	...	"	2s. 9d. to 3s.
Ducks, Muscovy ...	...	...	...	...	...	"	3s. 3d. to 4s.
Turkeys (Hens) ...	...	...	...	...	...	"	5s. to 6s.
Turkeys (Gobblers)	...	...	...	...	...	"	8s. to 12s.

TOP PRICES, ENOGGERA YARDS, MARCH, 1911.

Animal.							FEBRUARY.
							Prices.
Bullocks ...	...	...	...	...	...	...	£7 to £8 17s. 6d.
Ditto (single) ...	...	...	...	...	...	...	£10 12s. 6d.
Cows ...	...	...	...	...	...	...	£6 5s. to £7
Merino Wethers ...	...	...	...	...	...	...	17s.
Crossbred Wethers ...	...	...	...	...	...	...	19s.
Merino Ewes ...	...	...	...	...	...	...	14s. 3d.
Crossbred Ewes ...	...	...	...	...	...	...	17s.
Shropshire Ewes ...	...	...	...	...	...	...	18s. 3d.
Lambs ...	...	...	...	...	...	...	14s. 3d.

PRICES OF FARM PRODUCE FOR MARCH.
LONDON QUOTATIONS.

Article.	MARCH.	
	Price.	
Cotton (Uplands), per lb. ...	...	7 $\frac{3}{4}$ d.
Cotton (Sea Island), per lb. ...	...	20d.
Cotton Seed, per ton ...	...	£8 11s.
Rubber (Parà), per lb. ...	...	5s. 10d. to 6s. 11d.
Copra (S.S.), per ton ...	...	£22 5s. to £23 10s.
Copra (Ceylon), per ton ...	...	£24 15s. to £25 15s.
Copra (Malabar), per ton ...	...	£25 5s. to £26 5s.
Hemp (Manila), per ton ...	...	£19 5s. to £20 5s.
Hemp (Sisal), per ton ...	...	£20 10s.
Hemp (Indian Sisal), per ton ...	...	£13 to £18.
Hemp (Mauritius), per ton ...	...	£25 10s. to £26 10s.
Business confined to second-hand lots on the basis of £25 to £25 10s. Prime quality not obtainable. Extreme scarcity of this article prevails in Mauritius.		
Ramie Fibre (China Grass), per ton ...	...	£29 to £46
Soja Bean Oil, per cwt. ...	...	£1 13s.
Soja Beans, per ton ...	...	£7 10s. to £8 2s. 6d.
Coffee (Costa Rica)—		
Fair Greenish, per cwt. ...	...	63s. to 64s.
Low Middling, per cwt. ...	...	64s. to 88s.
Bold Fair, per cwt. ...	...	66s. to 72s.
Peaberry, per cwt. ...	...	74s. to 92s.

Times of Sunrise and Sunset at Brisbane, 1911.

DATE.	MAY.		JUNE.		JULY.		AUGUST.			PHASES OF THE MOON.
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.		
1	6:13	5:17	6:30	5:1	6:39	5:3	6:30	5:18	5 May	☾ First Quarter 11 14 p.m.
2	6:14	5:16	6:31	5:0	6:39	5:4	6:30	5:19	13 "	○ Full Moon 4 10 "
3	6:14	5:15	6:31	5:0	6:39	5:4	6:29	5:19	21 "	☾ Last Quarter 7 23 "
4	6:15	5:14	6:32	5:0	6:39	5:4	6:29	5:20	28 "	● New Moon 4 24 "
5	6:15	5:14	6:32	5:0	6:39	5:5	6:28	5:20		
6	6:16	5:13	6:32	5:0	6:39	5:5	6:27	5:21		
7	6:16	5:12	6:33	5:0	6:39	5:6	6:27	5:21		
8	6:17	5:12	6:33	5:0	6:39	5:6	6:26	5:22	4 June	☾ First Quarter 8 4 a.m.
9	6:17	5:11	6:34	5:0	6:39	5:6	6:25	5:22	12 "	○ Full Moon 7 51 "
10	6:18	5:10	6:34	5:0	6:39	5:7	6:24	5:23	20 "	☾ Last Quarter 6 51 "
11	6:18	5:10	6:34	5:0	6:39	5:7	6:24	5:23	26 "	● New Moon 11 20 p.m.
12	6:19	5:9	6:35	5:0	6:39	5:8	6:23	5:24		
13	6:20	5:8	6:35	5:0	6:38	5:8	6:22	5:24		
14	6:20	5:8	6:36	4:59	6:38	5:9	6:21	5:25		
15	6:21	5:7	6:36	4:59	6:38	5:9	6:20	5:25		
16	6:21	5:7	6:36	5:0	6:38	5:10	6:19	5:26	3 July	☾ First Quarter 7 20 p.m.
17	6:22	5:6	6:37	5:0	6:37	5:10	6:18	5:26	11 "	○ Full Moon 10 53 "
18	6:23	5:6	6:37	5:0	6:37	5:11	6:18	5:27	19 "	☾ Last Quarter 3 31 "
19	6:23	5:5	6:37	5:0	6:37	5:12	6:17	5:27	26 "	● New Moon 6 12 a.m.
20	6:24	5:4	6:38	5:0	6:36	5:12	6:16	5:28		
21	6:24	5:4	6:38	5:0	6:36	5:13	6:15	5:28		
22	6:25	5:4	6:38	5:1	6:35	5:13	6:14	5:29		
23	6:25	5:3	6:38	5:1	6:35	5:14	6:13	5:29		
24	6:26	5:3	6:38	5:1	6:35	5:14	6:12	5:30	2 Aug.	☾ First Quarter 9 29 a.m.
25	6:26	5:2	6:39	5:1	6:34	5:15	6:11	5:30	10 "	○ Full Moon 0 55 p.m.
26	6:27	5:2	6:39	5:2	6:33	5:15	6:10	5:31	17 "	☾ Last Quarter 10 11 "
27	6:27	5:2	6:39	5:2	6:33	5:16	6:9	5:31	24 "	● New Moon 2 14 "
28	6:28	5:2	6:39	5:2	6:32	5:16	6:8	5:32		
29	6:28	5:1	6:39	5:3	6:32	5:17	6:7	5:32		
30	6:29	5:1	6:39	5:3	6:31	5:17	6:6	5:32		
31	6:30	5:1	...	...	6:31	5:18	6:5	5:33		

Orchard Notes for June.

THE SOUTHERN COAST DISTRICTS.

The notes of last month, referring to the care to be taken in the handling and marketing of all kinds of citrus fruits, apply with equal force during this and subsequent months till the end of the season.

Keep the orchard clean, and work the land to retain moisture. The handling of the citrus crop is the main work in many orchards, but where slowly acting manures are to be given their application should not be later than this month. They should be well mixed with the soil, so that when the Spring comes and the trees start a fresh growth a certain amount of plant food will be available for the trees' use. Heavy pruning should be done now, whilst the trees are dormant. All large limbs should be cut off close to the main stem; the edges of the cuts should be carefully trimmed, and the whole wound, if of large size, covered with paint or grafting wax, so that it will not start to decay, but soon grow over. When the soil of the orchard is becoming deficient in organic matter, the growing of a winter green crop, such as mustard or rape, is well worth a trial. Clear the crop of fruit from the part of the orchard to be so treated. Plough the land well; work the soil down fine so as to get a good seed bed, and broadcast the mustard or rape. A manuring of 4 cwt. of meatworks manure and 1 cwt. of sulphate of potash per acre will produce a very heavy crop of green manure, and the plant food not required for the production of such crop will be still available for the trees' use in Spring.

Pineapples and bananas should all be cleaned up, and the land got into first-class order. Pineapples, where at all liable to frost, should be covered with grass or other suitable material. The growth of weeds between the rows of pines on land liable to frost is one of the best ways of encouraging frost, as frost will strike dirty, weedy ground, and injure the pines growing thereon severely, when it will do little, if any, damage where the land is kept perfectly clean—another advantage of cleanliness in cultivation.

TROPICAL COAST DISTRICT.

Keep the land well cultivated—plough when necessary to bury weed growth, and get the surface of the ground into a state of thorough tilth, as moisture must be retained in the soil by cultivation to mature the spring crop of fruit. This applies not only to oranges and other tree fruits, but to bananas and pines as well. A good start in spring means good bunches of bananas and early ripening pineapples. Heavy pruning can be done now in the case of all trees not carrying a heavy crop of fruit, but where citrus trees are heavily loaded, the pruning should be put off till after the spring crop of fruit has been gathered. The spraying of the trunks and inside of the trees with the lime and sulphur wash can be carried out, and where Maori is making its appearance the sulphide of soda wash should be used as well.

SOUTHERN AND CENTRAL TABLELANDS.

The pruning of all kinds of deciduous fruit trees is the chief work of the month in the Stanthorpe district. Do not be frightened to prune severely, first, in the case of young trees, so as to get strong well-grown

trees instead of straggling top-heavy trees; and, second, in the case of trees that are going off in the size and quality of their fruit. Where peaches, apricots, plums, or nectarines are only making very little new growth, and that weak, so that the fruit produced thereon is small, it is advisable to head the tree hard back, so that it will throw out some vigorous branches in Spring that will form a new head for the tree. Apples, as well as plums and apricots, are sometimes inclined to over-produce fruit spurs, which become long and straggling, and bear a large quantity of small-size fruit. A vigorous shortening back and cutting out of such spurs will have a very beneficial effect in the quality and size of the fruit produced.

Gather and burn all prunings; and, where codlin moth is present in the orchard, examine the tree carefully when pruning it, so as to see if there are any cracks, crevices, or masses of loose bark in or under which the larvæ of the moth may be hibernating. All larvæ so found should be destroyed, and if the work is carried out systematically it will tend to materially decrease the crop of moths that will hatch out the following spring.

As soon as any part of the orchard is pruned, gather up the prunings, and work the land, as a thorough winter weathering of the soil is very beneficial in its effects; and, further, it will tend to destroy many insects that may be wintering in it. The planting of new orchards or of trees to replace any that may have died, or that have been proved to be unsuitable to the district, may be continued during the month, and right on till the end of the winter.

Do not prune vines in the Stanthorpe district, as it is advisable to leave the pruning as late as possible, but vine pruning can be done at any time now in the Roma or Central districts. Tree pruning can be continued during the month, and the orchard should be kept well worked. Citrus trees can be marketed. Lemons should be gathered and cured.

Farm and Garden Notes for June.

FIELD.—Winter begins on the 24th of this month, and frosts will already have been experienced in some of the more exposed districts of the Southern coast and on the Darling Downs. Hence, insect pests will, to a great extent, cease from troubling, and weeds will also be no serious drawback to cultivation. The month of June is considered by the most successful lucerne-growers to be the best time to lay down this crop, as any weeds which may spring up in the event of a dropping season will be so slow-growing that the young lucerne plants will not be choked by them.

The land should now be got ready for millets, sorghums, panicum, &c. Oats, barley, vetches, clover, tobacco, buckwheat, field carrots, and Swedes may now be sown. Some advocate the sowing of early maize and potatoes during this month, but, obviously, this can only apply to the more tropical parts of Queensland. The land may be got ready, but in the Southern districts and on the tableland neither maize nor potatoes should be planted before August, or at the earliest, in warm, early districts, at the end of July. There is always almost a certainty of frosts, more or less severe, during these months. Arrowroot will be nearly ready for digging, but we would not advise taking up the bulbs until the frosts of July have occurred. Take up sweet potatoes, yams, and ginger. Should there be a heavy crop, and consequently a glut in the market, sweet potatoes may be kept by storing them in a cool place in dry sand, taking care that they are thoroughly ripe before digging. The ripeness may be known by the milky juice of a broken tuber remaining white when dry. Should the juice turn dark, the potato is unripe, and will rot or dry up and shrivel in the sand pit. Before pitting, spread the tubers out in a dry barn or in the open, if the weather be fine. In pitting them or storing of them in hills lay them on a thick layer of sand, then pour dry sand over them till all the crevices are filled and a layer of sand is formed above them. Then put down another layer of tubers, and repeat the process until the hill is of the requisite size. The sand excludes the air, and the potatoes will keep right through the winter. Late wheat may still be sown, but it is too late for a field crop of onions. In tropical Queensland the bulk of the coffee crop should be off by the end of July. Yams may be unearthed. Cuttings of cinnamon and kola nut tree may be made, the cuttings being planted under bell glasses. Collect divi-divi pods and tobacco leaves. English potatoes may be planted. The opium poppy will now be blooming and forming capsules. Gather tilseed (sesame), and plant out young tobacco plants if the weather be suitable. Sugar-cane cutting may be commenced. Keep the cultivator moving amongst the pineapples. Gather all ripe bananas. Fibre may be produced from the old stems.

KITCHEN GARDEN.—Cabbage, cauliflower, and lettuce may be planted out as they become large enough. Plant asparagus and rhubarb in well-prepared beds in rows. In planting rhubarb it will probably be found more profitable to buy the crowns than to grow them from seed, and the same remark applies to asparagus.

Sow cabbage, red cabbage, peas, lettuce, broad beans, carrots, radish, turnip, beet, leeks, and herbs of various kinds, such as sage, thyme, mint, &c. Eschalots, if ready, may be transplanted, also horse-radish can be set out now.

The earlier sowings of all root crops should now be ready to thin out, if this has not been already attended to.

Keep down the weeds among the growing crops by a free use of the hoe and cultivator.

The weather is generally dry at this time of the year, so the more thorough the cultivation the better for the crops.

Land for early potatoes should now be got ready by digging or ploughing.

Tomatoes intended to be planted out when the weather gets warmer may be sown towards the end of the month in a frame where the young plants will be protected from frost.

FLOWER GARDEN.—No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool moist spring time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses and tie up, without pruning, to trellis or stakes, the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the summer bedding plants may be propagated.

Sow first lot, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground, but many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondii*, stocks, wallflower, and zinnias, &c., may be sown either in boxes or open beds; mignonette is best sown where it is intended to remain.

To grow these plants successfully, it is only necessary to thoroughly dig the ground over to a depth of not less than 12 in., and incorporate with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should then be raked over smoothly, so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well-decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days, thin out so as to leave each plant (if in the border) at least 4 to 6 in. apart.

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LIST OF AGRICULTURAL AND HORTICULTURAL SOCIETIES I.

DEPARTMENTAL ANNOUNCEMENTS VII.

NOTICE.**Queensland Agricultural Journal.**

It is hereby notified that the *Journal* will be supplied to all members of Agricultural and Horticultural Societies who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Schools of Arts will be supplied at the same rate.

Persons resident in Queensland whose main source of income is from Agricultural, Pastoral, or Horticultural pursuits, which fact should be stated on the attached Order Form, will receive the *Journal* free

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All remittances should be made by postal notes or money orders, but where they are unobtainable stamps will be accepted, though the Department accepts no responsibility for any loss due to the latter mode of remitting.

For your convenience an Order Form is attached. A cross on each side of the Order Form indicates to the recipient that his subscription is again due.

Amount of one year's subscription should therefore be forwarded with Order Form, without delay, to the UNDER SECRETARY, Department of Agriculture and Stock, Brisbane.

All subscriptions received for the *Journal* after the seventh day of the month will commence with the month after that on which payment is received. Previous copies available will be supplied at 6d. per copy.

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Agriculture.

WHAT IS PATTERSON'S CURSE?

In our February issue, we published a note on the weed known as "Patterson's Curse," and we have since had several inquiries about it. The Assistant Government Botanist, Sydney, has furnished the following particulars concerning the plant to the "Farmer and Settler," Sydney:—

Some confusion as to the identity of the weed known as Patterson's Curse having arisen lately in the Riverina, where the weed is spreading rapidly, the picture which appears herewith will be found interesting.



The drawing shows the plant itself—A, the floral stem (or inflorescence); B, the flower (or corolla), split and opened out; and C, the ovary with style.

Patterson's Curse (or to give it its botanical name, *Echium plantagineum*, Linn.) may be described in popular language as a coarse erect herb, one to several feet high, with numerous large funnel-shaped, blue flowers, nearly sessile on the upper part of the stem, with rough, hairy, lanceolate leaves large at the base of the stem, gradually becoming smaller upwards, and ending in small floral leaves or bracts between the flowers.

The plant is easily recognised by the large blue or purplish blue flowers. Blue is a comparatively rare colour in Australian flowers. There are several introduced weeds in New South Wales with small blue flowers not above a quarter of an inch long, but Patterson's Curse is the only weed with blue flowers that attain an inch in length or more. The

colour is often a beautiful intense blue; sometimes it merges into purple. Another distinctive character is the roughness of the leaves caused by the hard tubercles ending in stiff hairs, which densely cover the leaves. This character the weed shares with many Australian plants of the family Boraginæ, but with only one introduced weed—*i.e.*, the corn Cromwell, which, however, has small white flowers.

The fruits of Patterson's Curse are not often noticed by the casual observer. They consist of four hard, rough nutlets, concealed in the withered calyx when the blue corolla has dropped off.

The name "Patterson's Curse" is of local Australian origin. In England the various species of *Echium* are called "Bugloss," a name derived from the Greek, and meaning ox-tongue, with reference to the rough leaves, which are compared in shape and roughness to the tongue of an ox.

For the above description we are indebted to Mr. E. Betcher, the Assistant Government Botanist, and with its assistance farmers should be able to identify the weed without difficulty.

Mr. E. A. Hamilton, of Albury, who has had experience of the pest, describes "Patterson's Curse" as in no way injurious to stock. "In fact," writes Mr. Hamilton, "in the early spring I consider it one of our best fodder plants, as the first leaves are very succulent, and it is the quickest growing plant in frosty weather. When the plant matures, however, the flower-stock is very rough and hairy, and the stock will not eat it; and then, when it seeds and dies off, all the grass is killed underneath, and there is nothing left on the paddock at all." In places it has been got rid of by turning large mobs of sheep on to infested paddocks and eating them bare several times in the year.

The plant was at first admired for its flower, but it is now rapidly spreading, and may be seen in many districts besides the Riverina. It has a particular liking for rich black soil and river frontage country, and should be rigorously suppressed wherever it appears.

LINSEED.

It has been reported from London that there is a very great scarcity of linseed, and that, as a consequence, prices have risen considerably. The flax plant finds a congenial home in many parts of Queensland, and it might prove a great source of profit to farmers if they devoted a portion of their land to the cultivation of a plant which not only produces the flax of commerce, but also the valuable seed which produces the oil which is used in enormous quantities in many trades.

A correspondent of the "Brisbane Courier" writes as follows on the subject of the market for linseed in England:—

"Unusual scarcity of linseed prevails, and despite the phenomenally high prices ruling, which have not attained such a level for very many years—since about the time of the Crimean War—there is little prospect of much easier rates in the near future. The present state of the linseed oil market is highly sensitive and nervous, inflation and depression alternating with startling rapidity, without showing much change, although recently the tendency has been rather weaker. The prices ruling in forward positions are also extremely stiff, and indicate that little relief is anticipated before the end of the summer. Wide estimates of the Argentine crop have been circulated, but the outturn is only moderate, of which about one-third is required by the United States to help make up the deficiency of their home supplies. Fortunately (says an exchange) the Indian linseed crop promises well owing to favourable

atmospheric conditions, and supplies will much exceed last year, partly compensating for the deficiency in the Argentine crop. On balance, however, the world's supplies are barely sufficient to satisfy all requirements; consequently quotations for linseed must continue to rule at a higher level than manufacturers have been long accustomed to. The position is also rendered more awkward by the smaller quantities of Soya beans exported from China during the latter half of 1910, while during last January there were no arrivals into England. At present the export of Soya beans is hampered by the conditions of labour and transport in China owing to the plague there, and shipment is difficult, which reduces immediate supplies to a minimum. The situation is undoubtedly serious, not merely because linseed oil is exceptionally dear, but because there is not enough of it to meet the requirements of manufacturers of paint, varnish, oilcloth, linoleum, and other goods. The extraordinary demand for all fatty oils from the United States for some time has made the position awkward for other countries, and from the fact that the United States is the largest consumer of linseed oil in the world the outlook can easily be understood. It has to be seen whether American requirements may need to be further supplied from England and the Continent, but linseed oil is dear enough, and it is quite probable that some of the trades which have hitherto worked linseed oil only in their manufactures may turn to substitutes, which would curtail consumption and perhaps bring values down to a more moderate basis. For some time paint and varnish makers have been confronted with the problem of adjusting selling prices to the increased cost of the most important raw materials. Besides linseed oil being dear, turpentine and rosin have reached quotations which were regarded as quite improbable a short time since. Substitutes are also being pushed for all they are worth, and advantage is taken of the situation to ask extreme rates. The feeling of anxiety which has characterised the linseed oil market for some time is in no way modified, and those people who can temporarily dispense with the use of the article are fortunate."

MARKETING BROOM MILLET.

A practical farmer in New South Wales, who is largely interested in the cultivation of broom millet, gave a few opinions in "The Farmer and Settler" on an article on the subject which appeared some weeks ago in that journal. He indicated some of the difficulties connected with handling the crop on theoretical and scientific lines. We think that growers in this State will scarcely agree with the contention that bending and grading do not pay. At all events, in the case of fruit, butter, cotton, wool, sisal hemp, and many other products, it is by means of grading that the best profits accrue to the producer. "Sell the whole crop, and let the buyer do the classing," as is this farmer's practice, means putting a large part of his own profit into the buyer's hands. Mr. Macnamara, the farmer alluded to, writes :—

"The proposal that the heads should be turned down, it was remarked, would involve far more labour than it was worth, as only a small number of heads are damaged. Even more impracticable, he said, was the suggestion that the crop should be dried in a shed. To do it in the way suggested would take a very big shed indeed. With the grower it is all a case of weather in drying off millet. It has to be left exposed to the sun, and two days of bright weather will make very nice millet. Of course, if rain comes then it discolours, but in a year when millet is scarce the broom-makers will raise no objection on that score. In any

case, drying in a shed is impossible. Part of my crop was out for a week this season, and finished well, but after the first couple of days I tied it in bundles and left it so. It is much more convenient to handle after than if gathered loose. The rope should be cut about a yard long and then conveniently filled. Six or seven inches of stalk I find to be the right length for cutting, and it seems to suit the manufacturers, too. Classing we do not find a payable practice, for in a season when millet is plentiful the buyer takes the good stuff and rejects the second class altogether, or gives a very poor price for it, whereas in a poor year he will buy almost anything. Sell the whole crop, and let the buyer do the classing; that is our practice, and it is supported by experience.

"Commenting generally on the millet crop on the Hunter this year, Mr. Macnamara said it was a poor, light crop. Some exceptional yields have been harvested, as in one case in which an area of $8\frac{3}{4}$ acres gave 6 tons 8 cwt., as well as a fine lot of seed. This was grown on old lucerne ground. But many crops on the Hunter will not cut 3 cwt. per acre. 'It wants £25 per ton at least to pay to grow millet,' this grower added.

"With the complaints of some agents that a good deal of millet was being marketed with too much seed on it, Mr. Macnamara unhesitatingly agreed. Some of the millet he had seen while in Sydney had too much seed on it altogether. 'It should be hackled clean,' was his final remark.

"Since the time of Mr. Macnamara's visit, Mr. G. Marks (Inspector of Agriculture) has made the remark that farmers on the North Coast are making a practice of saving broom millet seed from the brush when it is being prepared for market. Such seed, he points out, is not properly matured, and a continuation of this practice must inevitably mean a deterioration in the quality of broom millet."

LIME AND COUCH GRASS.

By P. J. MURPHY.

In many of the coastal districts of Queensland we look upon couch grass as one of the most valuable pasture grasses we possess, and it is a recognised fact that good pastures, in which a considerable quantity of this grass is to be found, are always best for the rearing of young stock, as well as being specially good for dairy cows and brood mares. I consider, therefore, that the discovery of a sure and easy method of encouraging the growth of couch grass on pasture land will be rightly appreciated by every land owner in this part of Queensland.

In this article, I propose to point out a sure and easy method of encouraging the growth of couch grass, and also to give some explanation why this grass, or pastures containing much of it, should be considered good for young stock and dairy cows.

For the first part of this information I do not intend to go outside my own practical experience. The discovery may have been made often before, in other times and other places, but it was also made by myself from local observation, and without any outside aid or information whatever.

For the past ten years I have taken special interest in noting the effects produced on plants and soils by the application of certain mineral fertilisers, and I must admit that I was more than surprised at seeing how a very light application of lime encouraged the growth of couch grass. I was also astonished to find that it is practically impossible to apply too much lime on couch grass, and almost unconsciously I formulated the axiom: "The more lime, the more couch."

I will not attempt to explain here the scientific principles underlying the truth of the above axiom, as such a discussion is outside the scope of this article. We must here look to facts rather than to theories—facts which have been proved by observation and experience.

Simple facts of this nature may, in time to come, have far-reaching consequences, and they should be at once recorded as useful local axioms for the benefit of later generations, who will probably have less time for the observation and study of nature than we have had.

I have seen certain small portions of land in this district covered with large heaps of waste lime where, in some cases, the heaps were 4 ft. or 5 ft. in depth. One would think it impossible for any grass to grow in contact with so much lime; but in a few years afterwards I saw those heaps of lime so completely covered with the matted stems and roots of couch grass that a stranger might easily mistake those large heaps of waste lime for mounds of very good fibrous loam or alluvial soil.

I have seen certain grass paddocks manured with large quantities of "filter-press cake," from raw sugar mills, and in the course of a few years afterwards those paddocks were literally smothered in couch grass. Filter-press cake contains a big percentage of lime in a very available state. I have seen similar results where pure lime was applied.

Again, I have seen molasses drains nearly choked with couch grass, which had grown on the bottom and sides; and the seeds of this grass when carried down by the molasses grew on some very poor land, and soon covered the surface with a thick sward of couch grass, though the molasses first killed all the vegetation it came in contact with.

This result I attribute mainly to the presence of lime (in a very available form) in the molasses.

I may mention that my observations in this respect have been confined to the Bundaberg and Isis districts, and I feel sure there has been as much lime wasted in those districts during the last twenty years as would grow sufficient couch grass in every horse paddock and dairy farm in both those districts.

I have known a dairy farm on which the cows were always in good health and condition, so long as they were not giving milk or rearing calves; but when giving milk the cows became weak, and never reared good calves. The Government veterinary surgeon was consulted, and came on the scene. He considered the land required a dressing of lime or bone-meal, and recommended that a "lick" of lime and bone-meal be provided for the stock.

There are many horse paddocks in this district in which it is impossible to rear a good foal; but those paddocks would probably be greatly improved for the use of brood mares and foals by a top-dressing of lime every fourth or fifth year.

It has been found that the bones of animals contain a big percentage of lime, and that it is essential that the food of young growing animals should always contain the full natural proportion of lime.—"Australian Sugar Journal."

[The above article, which is of considerable interest to farmers, was submitted to us by Mr. J. C. Brännich, Agricultural Chemist, who makes the following remarks thereon:—"The necessity of lime for grasses has been well known for a long time, and application of lime in the form of carbonate, and principally gypsum, is generally very beneficial. Unfortunately, the cost of lime in Queensland is quite prohibitive for agricultural purposes. Most of our coastal lands require liming, particularly if pasture is used for dairy and breeding cattle. The work of Mr. Murphy is, however, creditable, as the importance of liming is still much overlooked by our farmers.—Ed. "Q.A.J."]

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

RECORD OF COWS FOR MONTH OF APRIL, 1911.

JERSEYS.

Cow.	Date of Calving.	Milk.	Test.	Butter.	At per lb.	Value.
		Lb.		Lb.		£ s. d.
Careless	16-12-1910	580	4·6	30·02	10d.	1 5 0
Miss Edition	1-2-1911	520	4·8	28·13	„	1 3 5
Two Cows	...	1,100	9·2	58·15	„	2 8 5
Average	...	550	4·6	29·07	„	1 4 2

SHORTHORNS.

Red Rose	1-3-1911	863	4·8	47·05	10d.	1 19 2
Butter	15-8-1910	413	6·7	32·51	„	1 7 1
No. 6	2-3-1911	711	4·0	31·77	„	1 6 6
Honeycomb	25-6-1910	440	6·0	31·02	„	1 5 10
Gem	10-1-1911	566	4·5	28·62	„	1 3 10
Nellie II.	30-11-1910	778	3·3	28·36	„	1 3 8
Patch	16-11-1910	481	4·8	26·01	„	1 1 8
Dot	26-12-1910	479	4·8	25·90	„	1 1 7
Eight cows	...	4,731	38·9	251·24	„	10 9 4
Average	...	591	4·9	31·4	„	1 6 2

AYRSHIRES.

College Lass	23-8-1910	572	6·5	43·68	10d.	1 16 5
Linda	12-2-1911	1,029	3·8	43·57	„	1 16 4
Lark	22-12-1910	816	3·8	34·55	„	1 8 9
Lerida	15-2-1911	892	3·2	31·47	„	1 6 3
Lady Margaret	4-2-1911	785	3·6	31·4	„	1 6 2
Laura	28-1-1911	627	3·9	27·28	„	1 2 9
Davidina	7-10-1910	532	4·2	25·02	„	1 0 10
Seven cows	...	5,253	29·0	236·97	„	9 17 6
Average	...	750	4·1	33·85	„	1 8 2

GRADES.

Cow.	Breed.	Date of Calving.	Milk (lb.)	Test.	Butter (lb.)	At per lb.	Value.
Comet	Grade-Holstein ...	15-1-11	635	5·9	44·02	10d.	£ s. d. 1 16 8
Lady Sue... ..	" "	7-4-11	661	4·3	31·87	"	1 6 7
Maggie	" "	10-2-11	795	3·4	29·91	"	1 4 11
Three Cows ...	...	...	2,091	13·6	105·80	"	4 8 2
Average	...	...	697	4·5	35·27	"	1 9 5
Orange	Guernsey-Shorthorn	6-12-10	528	5·3	32·88	10d.	1 7 5
Graceful	" "	28-12-10	564	4·6	29·18	"	1 4 3
Two Cows	...	...	1,092	9·9	62·06	"	2 11 8
Average	...	...	546	4·9	31·03	"	1 5 10
Lemonade	Grade-Guernsey ...	25-5-10	373	5·8	25·41	10d.	1 1 2
Lubra	" Jersey ...	28-3-11	1,116	3·4	41·99	"	1 15 0
Mona	Holstein-Shorthorn	14-8-10	520	5·6	34·21	"	1 8 6
Poppy	Guernsey-Jersey...	14-3-11	999	3·7	41·31	"	1 14 5
Whitefoot	Holstein-Devon ...	9-4-11	879	3·9	40·27	"	1 13 7
Five Cows	...	...	3,887	22·4	183·19	"	7 12 8
Average	...	...	777	4·5	36·64	"	1 10 6

AVERAGE FOR GRADES.

Ten Cows	...	...	7,070	45·7	351·05	10d.	14 12 6
Average... ..	...	...	707	4·6	35·11	"	1 9 3

AVERAGE OF TWENTY-SEVEN COWS FOR APRIL, 1911.

No.	Breed	Milk (lb.)	Test.	Butter (lb.)	At per lb.	Value.
2	Jerseys... ..	1,100	9·2	58·15	10d.	£ s. d. 2 8 5
8	Shorthorns	4,731	38·9	251·24	"	10 9 4
7	Ayrshire	5,253	29·0	236·97	"	9 17 6
10	Grades	7,070	45·7	351·05	"	14 12 6
27	...	18,154	122·8	897·41	"	37 7 9
	Average	672	4·7	33·24	"	1 7 8

Average cow value £1 7s. 8d. for month of April.

* All the cows, with the exception of Ne'lie II., Linda, Lerida, Lady Margaret, Davidina Poppy, and Lubra, were fed on natural pastures only. The seven animals here mentioned received a daily ration of 15 lb. of oaten and lucerne chaff mixed with 3 lb. of bran. The cross-breed cow, Whitefoot, gave 879 lb. of milk, equal to 40·80 of commercial butter for a milking period of 21 days. This animal also won first prizes for the greatest yield of milk at the recent Toowoomba and Esk shows.

The Horse.

CLYDESDALE HORSE SOCIETY.

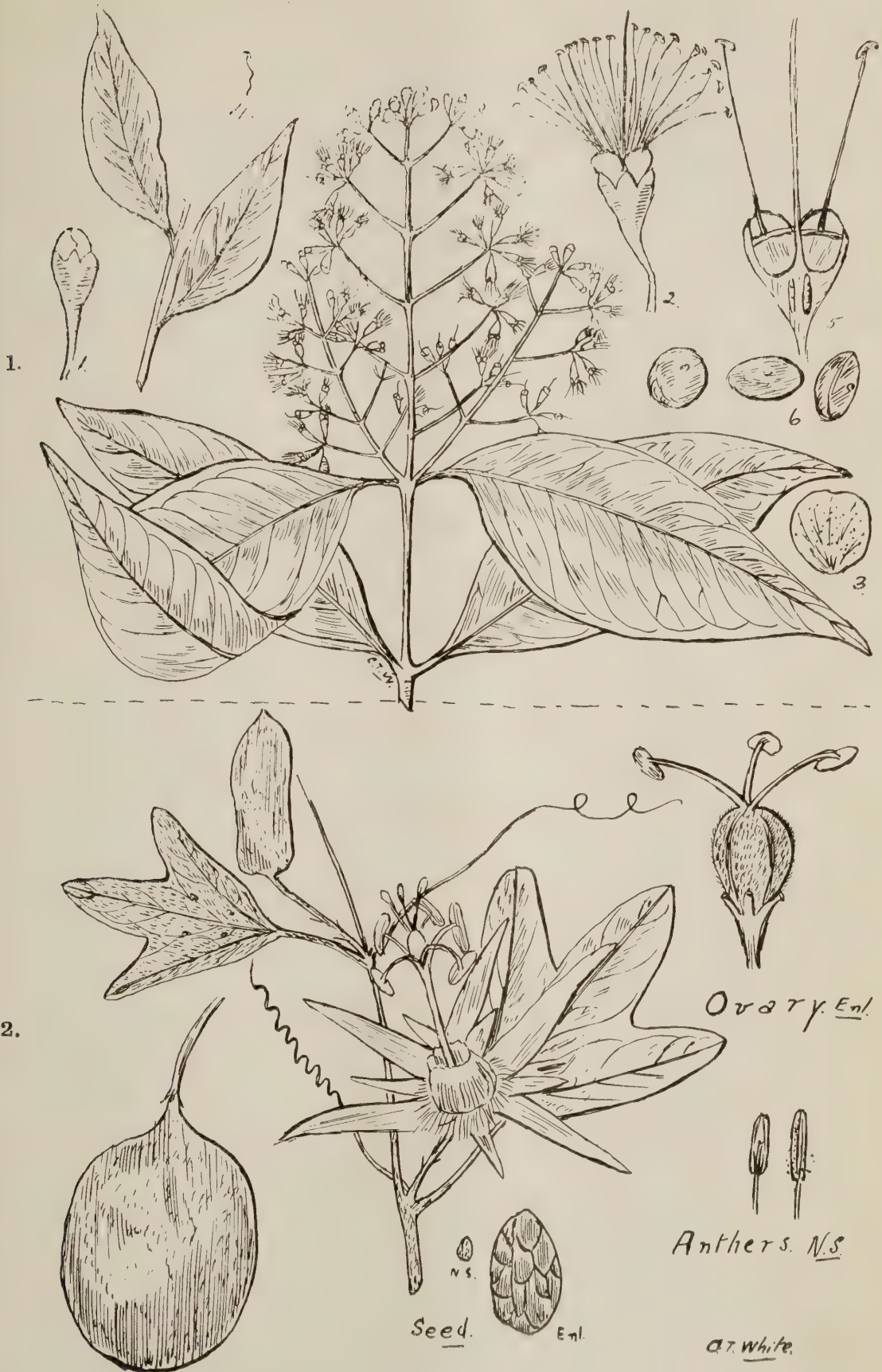
The annual report for 1910 of the Clydesdale Horse Society of the United Kingdom of Great Britain and Ireland states that few who were prominently identified with the founding of the Clydesdale Horse Society in 1877 now remain, and probably none of them anticipated the time when there would be in one year an export record of Clydesdales of 1,531 head, a membership of 1,854, and a capital at credit of the society of £7,235 2s. 5d. Yet these are the conditions which the Council have to report as characterising the society at the close of the thirty-fourth year of its history. 1910 was easily the most prosperous year the society has ever enjoyed. The breeding of Clydesdale horses has now become a world-wide industry. In the British Isles there has been a remarkable extension of interest in the breed. Districts like the county of Caithness, in which formerly only a languid interest was felt in horse-breeding, are now very much alive to its importance. The activity in and buoyancy of the market are significantly indicated by the fact that already, and for several months past, no fewer than a dozen stallions are hired for 1912. Various features in the export trade call for special notice. The 1,531 total was made up of 1,029 mares and fillies and 502 stallions. The largest customer was Canada, which took 1,302 head. Every animal exported to Canada must be numbered in the stud-book of this society, and its pedigree certified in duplicate by the secretary of this society direct to the National Live Stock Records Office in the Department of Agriculture at Ottawa. An animal which qualifies for the Canadian rules qualifies for the rules of any other country or colony in the world purchasing Clydesdales. To the United States there were exported, in 1910, 115 head. During the year 177 new members joined the society. Two were life governors, 49 were life members, and 126 were annual members. During the year there were deleted from the roll through deaths, resignations, and members being in arrears, the names of 1 life governor, 24 life members, and 31 annual members—a total of 56. The net increase is, therefore, 1 life governor, 25 life members, and 95 annual members—a total of 121, making the membership at date 1854. —“Galloway Gazette.”

PROSERPINE CENTRAL MILL.

The Proserpine Central Mill has assets valued, according to the Auditor-General's report, at upwards of £74,000; whilst the total amount advanced by the Government was £63,483 (including £9,483 for new work). The total liabilities at date of last statement were £66,263, including an amount still due to cane-growers. The net profit of last season was £12,673, after debiting maintenance and renewals, together with interest and redemption.

The 1910-11 season was one of the most successful yet experienced at the Proserpine Mill, and the quantity of cane crushed was 41,249 tons, from which were made 5,004 tons of sugar at 88 per cent. net titre. The amount of cane required per ton of sugar so manufactured was 8.24 tons, and the average cost of manufacture (including price paid for cane) was £7 10s. 8d. per ton of sugar. This was lower than the cost at any of the other mills in the hands of the Government.

Settlement in the neighbourhood has advanced rapidly in recent years, and the number of suppliers to the mill is now 207 as against 74 in the year 1900.—“Australian Sugar Journal.”



1. *EUGENIA FRANCISII*, *Bail. sp. nov.* —
 1. Fl. bud. 2. Flower. 3. Petal. 4. Anther. 5. Long. sect. fl., pet. and all the stamens except two removed. 6. Fruit. 1, 2, 3, and 5 enlarged; 4 and 6 nat. size.
 2. *PASSIFLORA AURANTIA*, *Forst.*, VAR. *PUBESCENS*, *Bail.*

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

By F. MANSON BAILEY, C.M.G., F.L.S., Colonial Botanist.

Order LEGUMINOSEÆ.

CASSIA, Linn.

C. tomentosa (Linn.), Baker. Hooker's Fl. Brit. Ind. II., 263. A tall shrub, with the branches and leaves beneath densely mottled with grey tomentum. Leaves on short petioles, 3 to 4 in. long; leaflets oblong, obtuse, oblique at the base, 12 to 16, stipules narrow caducous. Flowers bright-yellow, middle-sized, in copious distinctly pedunculate corymbose racemes. Lower anthers much larger than the others. Pod narrow, turgid, many-seeded, 1 to 5 in. long, finely downy.—Baker in Fl. Brit. Ind. II., 263. A tropical American species now overrun over many warm countries.

Hab.: Queensland. Spreading in some parts. First brought to my notice as spreading on the Darling Downs by Mr. Jas. Porter, of Pittsworth. It should be stopped, or may become a pest like many others of the genus.

Order MYRTACEÆ.

EUGENIA, Linn.

SECTION SYZYGIUM.

E. Francisii, Bail. sp. nov. (Plate XXXI.) Water Gum of Kin Kin. A very large glabrous tree, said by Mr. Francis to attain a trunk diameter of 7 to 8 feet. The branchlets rather slender and somewhat flattened. Leaves lanceolate to ovate-lanceolate, $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long, $\frac{1}{2}$ to $1\frac{1}{4}$ in. broad, on short broadish petioles, glossy-green on the upper, pale on the undersides, the lateral nerves very slender and crowded with a wavy reticulation between the marginal nerve some distance from the margin. Inflorescence terminal and lateral, in trichotomous panicles or cymes, usually slender, often less than 2 in. long, the branchlets of the inflorescence ending in heads of from 3 to 6 pedicellate flowers. Buds obtuse, small. Calyx bearing 4 short triangular lobes. Petals 4, yellowish white, glandular dotted, rotund, free. Stamens $1\frac{1}{2}$ lines long flexuose; anther-cells parallel. Fruit purple, depressed, globular, crowned by the calyx-lobes, diameter nearly $\frac{1}{2}$ in., depth nearly 3 lines.

Hab.: Kin Kin Scrubs. W. D. Francis, who says—"It is the largest tree of these scrubs, with the exception of the Kauri pine and the larger fig trees. The name 'water gum' is derived from the fact that very large quantities of a clear liquid gush from the pipe of the barrel when these trees are cut towards the centre, but the sap-like flavour which impregnates the liquid unfits it for drinking purposes."

Order PASSIFLOREÆ.

PASSIFLORA, Linn.

P. aurantia, Forst.; var. **pubescens**, Bail. (Plate XXXI.) Plant of slender growth, pubescent, without petiolar glands. Flowers yellow, dying off a reddish colour. Fruit oval, exceeding 1 in. long.

Hab.: Ipswich, T. F. Hall, May, 1909. Dr. T. L. Bancroft, Eidsvold, April, 1911.

In the Queensland Flora, page 689, I have followed Baron Mueller and given one of our Passifloras as *P. aurantia*, Forst., and the *P. Banksii*, Benth., only as a synonym. In publishing the present new variety, it seems, however, advisable to place *P. Banksii* also as a variety particularly as so far as known to me in Queensland; the petioles of var. *Banksii* are always furnished with 2 glands, while in var. *pubescens* they are always wanting.

FICUS, Linn.

SECTION UROSTIGMA.

F. Muellerii (*Miq.*), *Benth.* Fl. Austr. VI., 167. (Plate XXXII.) A small spreading headed glabrous tree, often branching from near the base. Branchlets somewhat angular, with scattered lenticels. Leaves about 3 in. long $1\frac{1}{4}$ in. broad, of a more or less deeper green, tapering to but obtuse at both ends; lateral nerves rather numerous and parallel, midrib and petiole nearly white, the latter slender, about 1 in. long. Stipules or leaf-scales from 6 to 15 lines long, narrow acuminate. Receptacles in pairs, but one maturing long after the other, thus appearing solitary; peduncles very short, basal bracts very short or altogether wanting. Receptacle globular, or slightly longer than broad, about 5 lines diam., smooth, dotted. Male flowers pedicellate, perianth segments 3, short and blunt. Anthers prominent, greyish. Gall flowers pedicellate. Female flowers, perianth segments 2, transparent, narrow, acute. Styles short with narrow oblique stigma.

Hab.: Brisbane River; Cabbage-tree Creek, *J. F. Bailey.*

F. macrophylla, *Desf.*; var. **pubescens**, *Bail.* (Plate XXXIII.) This tree has been long confused with the normal form known as Moreton Bay Fig; like that it forms a large tree, but while that is glabrous, or nearly so in all its parts, this variety is more or less densely clothed with short, brown hairs; its leaves are also smaller on shorter petioles. The largest leaf-scales seen about 3 in. long. $\frac{1}{2}$ in. broad at base, and tapering to a fine point. Its receptacles differ very considerably—they are of a flattish oval approaching a bluntly 3-angular, about 1 in. long, $\frac{3}{4}$ in. broad, of a yellowish colour, and covered with short warts of a deeper yellow and wax-like, making the receptacle very rough, when quite matured soft, of a reddish purple, quite smooth, the warts appearing only as dots. Peduncles from 4 lines to about 1 in., somewhat thick.

Hab.: South Queensland. Perhaps a distinct species, but from the general appearance of tree and ripe fruit, closely resembling the normal form. May often be seen grown in mistake for *F. macrophylla* in and near Brisbane.

SECTION COVELLIA.

F. semicostata, *Bail. sp. nov.* (Referring to the prominent ribs on the lower half of the fruit.) (Plate XXXIV.) A cluster fig, and very closely related to both *F. variegata*, Blume, and *F. glomerata*, Roxb. A tree with wide spreading head, very leafy, giving a good shade. Leaves glabrous, thin-coriaceous, glossy-green on both sides, but paler beneath, long-ovate, acuminate, 4 to 7 in. long, 3 to 4 in. broad, rounded or cuneate and oblique at the base, lateral nerves prominent, the lower two opposite the others alternate and distant about 8 or 9 on each side of midrib, margins entire; petioles 2 to 3 in. long, nearly or quite glabrous. Stipules silky-pubescent, narrow-lanceolate, about 9 lines long, for some time persistent near the ends of the branches. Receptacles on the trunk and thick branches and sometimes on the thinner branches of the head of the tree, in masses of short or longer branches bearing stipules but no leaves, the receptacles very numerous, often appearing like racemes of green and reddish-brown, when quite ripe fruits $1\frac{1}{2}$ in. diameter; peduncle 3 lines long, basal bracts 3 or 4, rounded, ciliate. Receptacle pyriform, turbinate, the stipitate portion and half up the fruit prominently ribbed, the whole dotted with round or oval white dots; apical bracts of a dark glossy colour, roundish. The male and female flowers in separate receptacles. Male flowers crowded towards the orifice, perianth segments 3, loose and broad. Stamens 2, filaments free; anthers fairly large. The gall flowers seem to be wanting in perianth. Female flowers: perianth small and narrow. Style usually short, but sometimes long and slender, clavate.

Hab.: Queensland, *Mr. Walter Hill*; described from trees planted by him in Brisbane Botanic Gardens, under the name of *Ficus vesca*, F. v. M., and, as I have lately received specimens of the same tree from Mr. W. F. Bevington, of the Musgrave River, in all probability Mr. Hill brought the fine trees now in the Botanic Gardens from that locality on his first visit here in 1873.

Plate XXXII.



FICUS MUELLERII, *Miq.*

Plate XXXIII.



FICUS MACROPHYLLA, Desf., VAR. *PUBESCENS*, Bail. n. var.

Plate XXXIV.



FICUS SEMICOSTATA, Bail. sp. nov.—

A, sect. recept. containing male and gall flowers. *B*, sect. recept. containing female flowers.
C, male flower. *D*, anthers. *E*, gall flower. *F*, female flowers.

The Orchard.

BANANA MANURING EXPERIMENTS AT BUDERIM MOUNTAIN.

FOURTH PROGRESS REPORT.

The first harvest of fruit from the Banana Manuring Experiment Blocks has just been completed, and the results are quite satisfactory. The experiments show that exhausted banana lands, as long as the soil is in good physical condition and contains a fair amount of humus, may be made to yield fair profitable crops with thorough cultivation and heavy manuring.

Our manurial basis, the minimum quantity of fertilising materials necessary, which have to be applied annually to prevent exhaustion of good land, is—

160 lb. of Potash,
80 lb. of Phosphoric Acid,
40 lb. of Nitrogen per acre.

when the stools are planted 12 ft. apart, giving 302 stools per acre. With ordinary artificial fertiliser this amount works out to an application of $3\frac{1}{2}$ lb. of manure, at a cost of about $3\frac{1}{2}$ d., per stool.

On very poor, exhausted lands, this quantity of manure has to be applied *twice* a year, about March and October, so that at the end of the first harvest, in March, when the plants are eighteen months old, the plantation will have just received its fourth application of manure, and the second harvest would be obtained with five dressings of manure, at a total cost of about 1s. 6d. per stool, and with a probable harvest of about 10 doz. the first crop and 25 doz. the second harvest, under favourable weather conditions.

With regard to the actual artificial fertiliser to be applied, the experiments so far teach us that phosphoric acid should be applied in the form of superphosphate, nitrogen in the form of dried blood or of nitrate nitrogen (nitrate of soda or nitrate of lime). The stools which received nitrates gave by far away the best-looking and heaviest fruit. Ammonium sulphate does not appear to do well as a source of nitrogen. Other important points, as requirement of lime, chlorine, &c., will have to be decided by the results of the second series of experiments started towards the end of last year, and which on the whole look at present very promising.

The first series of experiments were planted and manured in October, 1909, and received their second application of manure in September, 1910, and a third application in April, 1911.

The first three experiments on Mr. Guy's land can, unfortunately, not be taken into account, as these rows suffered severely by heavy wash-away of soil; and the second experiment, which gave the highest yield at Mr. Foote's with 10 dozen per stool, does not show a similar result at Guy's.

On Mr. Guy's experimental field, No. 6 row gave a very fair return, only two stools out of the twenty-eight not bearing, and the rest averaging $7\frac{3}{4}$ dozen per stool. On Mr. Foote's block the same experiment averaged $8\frac{1}{2}$ dozen per stool, and very large, heavy bunches.

For the first harvest generally one good bunch per stool is expected, and the actual results of the experiments are as follow:—

FOOTE'S.					GUY'S.					
Number of Experiment.	Manures Applied.	Total Cost of Manure in Pence per Stool.	Number of Bananas per Stool.	Dozen of Bananas per Bunch.	Number of First Bunches in Experimental Blocks.	Number of New Suckers for Next Crop.	Number of Bananas.	Dozen per Bunch.	Number of First Bunches.	Number of New Suckers for Next Crop.
1	KPN	6½	96	9	32	73	18	6	7	55
2	2 (KPN)	12½	120	10	36	83	19	6½	7	66
3	½ (KPN)	3½	76	8½	27	70 (Poor)	11	4	6	47
4	Nil	Nil	49	5½	27	48 (Very poor)	15	6	6	44
5	½ (KPN)	3½	88	8	33	57 (Poor)	55	7	17	56
6	2 (KPN)	14	101	8½	35	73 (Poor)	86	7¾	26	57
7	(KPN)	7½	94	8½	34	72	55	6½	20	54
8	(KPN)	6½	104	9½	33	71	29	5¾	12	61
9	2 (KPN)	12½	106	9½	34	70	67	7½	21	53
10	KPN	5½	94	8½	34	66	47	6½	17	44
Number of stools for each experiment					36	...	...	...	28	...

NOTE.—
K = 160 lb. K₂O = 320 lb. sulphate of potash.
P = 80 lb. P₂O₅ 470 lb. superphosphate or Thomas phosphate.
N = 40 lb. N, as 286 lb. dried blood;
or 250 lb. nitrate of soda;
or 200 lb. ammonium sulphate.
2 (KPN) means double quantities.
½ (KPN) means half quantities.

The soil on the experimental field of Mr. Guy is unquestionably much more exhausted than that of Mr. Foote's, and consequently the number of blind bunches on the former field is very great. We find that in the unmanured (No. 4) row only six stools out of twenty-eight bore bunches of poor small bananas, with six dozen per bunch.

The prospects for the coming season are excellent, and should give yields on the fully manured plots from twenty-five to thirty dozen per stool, as pretty well every stool has two healthy suckers, as seen from record in the last column of the table. In the unmanured and highly manured plots these suckers are very much poorer. At the present the bananas on Mr. Guy's block look quite as well, and in some instances even better, than on Mr. Foote's block, but the former suffer very much more during the winter months.

J. C. BRÜNNICH,
Agricultural Chemist.

CIDER MAKING.

It has been stated that, in the Southern States, the apple crop has been so prolific that orchardists have been ploughing them in, the prices obtainable being too low to make it worth while packing them. Similarly, we have been informed that in the Stanthorpe district apples have been so plentiful that, in some cases, they have been fed to stock. Why should not the surplus crop be utilised in the manufacture of cider? It is easily made, is a most refreshing beverage, and in the summer, is much preferable to beer. How to make cider is explained simply in the following article in the "Farmer and Settler":—

Cider can be made from any kind of good, sound, ripe apples, but the fruit must be ripe—neither rotten nor unripe. When an apple is ripe enough to eat, it is ripe enough to grind for cider, but not until then.

A great mistake is often made by would-be cider-makers in mixing all sorts and conditions of apples together, as though quality and quantity were matters of no importance. Bitter, sweet, and sour can all be converted into cider, but bitter apples are the best; years of experience teaches this—the juice is the richest in sugar, it ferments more freely, it clarifies quickest, and it keeps best after fermentation.

It is always better to core apples before grinding, as the cider will not only taste and look better, but it will keep better. The extraction of the juice is the next step in the process. The apples are crushed or ground in mills, and the pulp sprinkled with one-sixth or one-fourth of its weight in spring or river water. Then allow it to remain in tubs for twelve or fourteen hours, during which time fermentation commences.

The pulp should then be placed on a kind of wicker frame or in coarse canvas bags, and after draining into suitable receivers, should be subjected to pressure in the cider press. The liquor which runs off first is the best, and should be kept separate, that which follows as the result of extreme pressure usually tastes of the pips and skins.

The extracted juice should next be put into casks with large bung-holes, and freely exposed to the air, but not to the sun, the casks being placed on "stillions," with flat tubs under them to catch the waste.

They must be constantly watched, and kept full, so that the barm or yeast, as it forms, may froth over and be carried off from the surface.

As soon as the sediment has subsided—which will take two or three days for weak, and eight or ten days for strong cider—the liquor should be racked off into clean casks previously sulphured with a cooper's match.

The casks containing the racked cider must be stored in a cellar or in a cool shed, and left there for some months to mature, when they can be re-racked for sale, or for home use.

Cider may be preserved for years by being put in air-tight cans, similar to those used for canning fruit. The liquid should first be settled and racked off from the dregs, but fermentation should not be allowed to commence before canning.

Statistics.

COMMONWEALTH METEOROLOGY.

RAINFALL OF QUEENSLAND.

TABLE SHOWING THE TOTAL RAINFALL FOR EACH MONTH OF THE YEAR IN THE AGRICULTURAL DISTRICTS OF QUEENSLAND.

STATIONS.	1910.									1911.			
	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.
<i>North.</i>													
Bowen	5.26	0.18	2.23	0.58	0.18	3.75	0.30	3.89	5.36	23.72	7.57	10.66	1.64
Cairns	16.13	3.51	6.59	Nil	3.59	1.34	1.67	7.27	11.59	34.49	27.43	35.35	52.31
Geraldton (Innisfail) ...	24.57	11.90	19.35	1.34	7.42	11.51	3.18	7.30	4.77	36.96	35.51	28.39	50.53
Gindie State Farm ...	...	...	2.65	1.45	Nil	...	...	...	3.87	11.69	4.15	2.29	...
Herberton	3.50	1.85	1.70	Nil	0.83	0.58	0.43	4.93	9.71	11.43	13.16	15.35	14.17
Hughenden	0.30	0.41	0.85	0.48	Nil	2.75	1.57	3.41	1.13	9.15	3.76	0.17	6.29
Kamerunga State Nurs.	...	...	...	Nil	3.39	...	2.06	...	...	...	23.08	...	52.28
Mackay	6.18	3.73	5.70	1.1	0.48	4.32	0.7	2.67	2.15	30.52	13.04	14.41	3.14
Mossman	...	...	...	...	1.91	2.90	3.17	10.36	19.91	32.76	21.95	71.64	37.10
Rockhampton	0.61	0.59	5.98	1.67	0.23	1.62	0.99	4.17	2.46	9.64	21.07	6.39	1.44
Townsville	2.29	0.26	1.05	0.33	0.3	3.34	0.11	2.53	6.77	25.40	19.24	4.24	3.02
<i>South.</i>													
Biggenden State Farm	0.73	1.08	5.25	0.92	0.28	...	2.36	4.59	5.93	10.37	7.34	6.25	...
Brisbane	1.22	0.43	6.74	0.39	...	2.72	3.27	2.49	13.99	10.30	5.84	4.69	0.88
Bundaberg	0.31	0.19	6.17	2.10	0.16	2.33	0.70	8.39	1.58	21.05	9.75	4.31	1.46
Crohamhurst	3.39	4.44	11.78	0.63	0.70	2.30	3.83	3.31	6.20	28.85	19.20	16.67	2.94
Dalby	Nil	Nil	6.06	1.42	0.64	2.11	3.96	4.09	3.29	8.08	2.24	3.20	0.76
Esk	1.19	0.27	4.74	0.58	0.23	4.65	3.41	3.84	7.53	11.90	6.04	3.54	0.99
Gatton Agric. College	0.69	0.61	5.05	1.99	0.60	...	3.60	2.85	6.84	12.03	3.98	2.80	1.38
Gympie	1.13	0.22	5.57	0.83	0.32	1.54	2.90	3.16	1.96	9.13	5.33	6.02	1.88
Ipswich	1.65	0.20	3.74	1.67	0.58	1.55	3.70	1.96	5.04	8.15	4.19	2.51	1.38
Maryborough	1.72	0.64	4.89	1.09	0.35	1.22	1.53	4.19	3.19	16.93	6.58	7.20	2.61
Roma	0.15	0.4	5.71	1.24	Nil	0.46	3.64	4.39	0.96	11.52	5.94	1.25	0.14
Roma State Farm	...	...	...	...	...	0.38	2.95	3.50	7.97	9.72	...	5.39	0.04
Tewantin	6.30	1.31	15.08	0.76	1.34	1.62	3.17	7.71	8.25	20.84	8.50	18.11	1.78
Warren State Farm	...	...	1.88	...	...	...	0.45	...	...	...	11.75	3.17	...
Warwick	0.68	0.55	3.16	1.82	0.54	1.39	2.20	3.86	3.46	7.13	2.01	3.12	0.74
" Hermitage State Farm	...	...	...	1.73	0.39	...	...	...	...	...	...	...	...
Westbrook State Farm	...	...	2.77	...	...	...	2.98	...	4.44	5.26	3.90	1.76	5.50
Yandina	3.26	0.40	13.13	0.70	0.15	0.88	3.34	5.16	16.05	12.04	10.73	12.02	2.68

NOTE.—The rainfall data in this table are compiled from telegraphic reports, and must be considered as approximate only.

GEORGE G. BOND, Divisional Officer.

Horticulture.

SWEET PEA CULTIVATION.

The following extracts are from a paper read by Mr. George Herbert at the Conference of the National (Eng.) Sweet Pea Society in December last. Though dealing with sweet pea growing under somewhat different conditions to our own, readers of "Garden and Field" will find much that is interesting and suggestive in the article:—

"In the present paper I give what has been my own experience in sweet pea culture, more especially for exhibition purposes. I always consider the secret of success lies in the preparation of the ground. No matter how good the variety or how clever the feeding, if the ground is not thoroughly prepared, one cannot reasonably expect good exhibition blooms, at least not such as are required to win prizes at the best exhibitions. I have found a fairly heavy soil suits sweet peas best, as they continue flowering for a much longer period and produce finer blooms, as a rule, than if grown on a light soil.

"The whole of the ground intended for sweet peas should be trenched to a depth of $2\frac{1}{2}$ ft. to 3 ft., and this should be done as early as possible. When trenching, have the two top spits turned from one trench to the other, and the subsoil, whether clay or sand, dug 1 ft. deep, adding to it plenty of good rotten manure, leaves, and bonemeal. If there is a clay subsoil, give it a good dressing of lime and ashes previous to turning the two top spits from the next trench on to it. I do not believe in putting in a thick layer of manure then a layer of soil, and so on, but I do believe in thoroughly mixing the whole of the soil and manure together. This allows the sweet peas abundant and good food from the beginning to the end of their career. Many people put manure 1 ft. thick at the bottom of a trench and none anywhere near the top, and the consequence is that all the time the plants should be making rapid progress they are at a standstill, and by the end of the season they have just found the manure.

"Trenching should be finished in time to allow the soil a good three months to settle down before planting time, and, in my opinion, nothing is so detrimental to sweet peas as loose soil. I always aim at making the soil quite firm, and as the trenching proceeds we slightly tread down each bottom layer as it is put back (provided it is not too wet). The top is left as rough as possible to allow the weather to do its work. Early in the spring, before planting, a thin layer of short manure is spread on the ground and a light dressing of lime and soot over the top, and the whole is forked in; directly the soil is dry enough it is trodden firmly, and it is then ready for planting.

"I consider the autumn is by far the best time for sowing sweet peas for all purposes. I prefer to sow in very shallow boxes, let the seeds germinate steadily in a cold frame, and when the seedlings are about 3 in. high pot them up singly in 3-inch pots, using a good loamy soil and potting firmly. They are then transferred to a cold frame, and plunged to the rim of the pot in ashes, and here they remain till they are planted out in their flowering quarters. White, lavender, and cream varieties I always sow in very sandy soil; in fact, my best results in the germination of white sweet peas have been from pure sand. The seeds are apt to rot if kept too damp, owing to their very thin skin.

“After potting, the seedlings should be kept moderately dry. Air should be admitted to the frame freely, and if the weather is open the lights should be taken off altogether; this keeps the plants sturdy and strong. To coddle sweet peas means to ruin them.

“For exhibition purposes I prefer rows to clumps, and allow at least 18 in. from plant to plant for all the strong-growing varieties. All are planted in double rows, but the individual plants are not placed opposite one another; 12 in. is allowed between the double row. This allows the air to circulate between the plants as they are growing, and keeps them from becoming sappy through overcrowding. Plant firmly, and place small twigs round each plant at once.

“A great deal has been written as to the best way of staking sweet peas, and I have tried various methods, but the system adopted last season pleased me most, and certainly was the most satisfactory. Two poles about 12 ft. high were put in at the end of each double row of 25 yards' length, and two more halfway between. A thin galvanised wire was then strained from pole to pole on the top, another in the centre, and one about 12 in. from the ground. Long sticks were then inserted in the ground outside the wires on either side of the row and tied back to the wires, this keeping them in an upright position and leaving a clear air-space of 12 in. down the centre of each double row of plants.

“When the plants are growing well, three of the strongest shoots on each should be retailed and all lateral growths removed; this applies to the stronger-growing varieties, such as Elsie Herbert, John Ingman, &c. Nancy Perkin and Earl Spencer will do better with two stems, or even one stem. If the more vigorous varieties do not have more than one stem, coarse blooms often result, and these badly placed on the stem. The lateral growths should always be removed when young, simply rubbing them out with thumb and finger. This early disbudding saves a great deal of time, besides allowing all the strength of the plant to go to the haulm which has to produce the exhibition blooms. The growths should be trained on the outside of the sticks, and this can easily be managed by an occasional tie.

“It is advisable to examine the sweet peas every day, for when about 3 ft. high the plants rapidly increase in strength and the tops get heavy, so that, if there should be a rough wind or a heavy shower and the tendrils do not happen to be in reach of a stick to cling to, the growths snap off or become so twisted as to spoil them. At this stage of growth, if the weather is warm, an occasional damping over in the evening is a great help to sweet peas. A fairly heavy Dutch hoe should be worked freely round the plants during the growing season, as this is a great help, more especially if the weather is dry.

“As regards feeding, very little artificial is needed if the ground has been well prepared. On light soils I admit more feeding will be needed than on heavy ones. I am a strong believer in soot as a manure, and this is worked round the plants with the Dutch hoe before being watered in; but I depend chiefly on what is put into the ground before planting, and artificial I look upon as stimulants to be used if needed, but they often do more harm than good. I saw an example of this last season at one of our largest shows. There were flower-stems considerably over 2 ft. in length, but the flowers would have looked a deal better on 6-inch stems. I asked the exhibitor how he obtained such long stems, and the answer was ‘Nitrate of soda.’ I had guessed as much, for, although the flowers had not travelled half the distance others in the show had,

they were too soft and flimsy to open properly after being put in water; in fact, after the first day scarcely anything but the stem was to be seen. I do not condemn patent manures, but say emphatically they must be used very carefully and in conjunction with natural manures and—hard work.

“Having made experiments with feeding both on heavy and light soils, I have found better results follow on heavy land with very little feeding than on light soil with heavy feeding, the ground being well prepared in each case.

“If late flowers are wanted from the same plants, is it a good plan to cut back alternate plants to one of the strong lateral growths that keep showing at the bottom of the haulm. This should be done about six weeks before the blooms are needed, and by keeping the early buds picked out as they appear the laterals will soon gain strength enough to produce really good blooms.

“Sweet peas should be cut freely, and not a single seed-pod should be allowed to form so long as flowers are needed for exhibition purposes. This advice has been quite unnecessary during the last two seasons, for it has been a trouble to get seeds to set at all.

“A few sweet peas benefit by a slight shading, and I think this is a point where some growers make a mistake. They endeavour to be extra careful, and put tiffany over all the plants, but what improves one variety spoils another. All the lavender, bronze, and cream varieties are improved by the sun, and lose their brilliancy or purity of colour if shaded. Such varieties as Nancy Perkin, Earl Spencer, Stirling Stent, and Dazzler are improved if shaded for about three days before they are wanted for show. After the flowers are cut, the shading should be removed at once, as it soon causes the plants to become drawn if left in position.”

SOYA BEANS.

Experimental plots of Soya beans were sown last season in various parts of Victoria (says the “Australasian”) under the direction of Mr. J. M. B. Connor, Agricultural Superintendent, and the reports to hand in regard to many of the crops are of a satisfactory nature. In the majority of cases abundant growth has been made, the plants having reached to heights of from 4 ft. to 5 ft., the show of bean pods being very heavy. The weights of plants grown upon measured areas have been carefully recorded and estimated, and the results show the growth to have been equal to from 10 to 12 tons of green fodder to the acre, this, according to Mr. Connor, being an excellent food for dairy cows and other stock. The seed from which the crops were grown was imported last year by the Department of Agriculture, and on its arrival Mr. Connor picked out a number of seeds of different kinds of Soya beans for the purpose of sowing them separately for seed production. The varieties were Guelip and Itosan (oil producers), and Baird and Brownie (forage kinds). From the special plots devoted to these varieties fair supplies of seed for next season are expected. Mr. Connor recommends the use of the fodder kinds in conjunction with Westernwold's ryegrass, lucerne, maize, peas, tick beans, barley, and oats, which will give a succession of green fodder to cows all the year round.

Tropical Industries.

THE BAMBARRA GROUND BEAN (*Voandzeia subterranea*).

By HOWARD NEWPORT, Instructor in Tropical Agriculture.

This plant and the seed it bears, like so many such that, originating in Africa, have gradually spread to other countries, is known by many names, and is variously quoted or referred to as the Bambarra Ground Nut, African Ground Bean, the Madagascar Pistachia Nut, the Bambarra Earth Nut, the Ground Pea, the Underground Bean, &c., as well as *Pistache malgache*, the Mauritius name, and a host of colloquial names in the various languages of the natives in Africa, Java, Madagascar, Mauritius, and elsewhere where it is grown and used as food. A number of these names are given in the articles referred to in the paper in this Journal, vol. XXVI., part 2, page 79, but are of no interest here.

The first small parcel of seed received at the Kamerunga State Nursery, Cairns, was under the colloquial African name of "Indhulubu," from a correspondent in Buluwayo, on 15th December, 1902. Later seed was also obtained from Santa Anna, California, U.S.A., on 10th February, 1905; and again from the Director of Forests, Mauritius, on 14th September, 1910, at the instigation of the Director of Tropical Agriculture of Western Australia, under the name of *Pistache malgache*.

In descriptions and notes of this plant the common Ground Nut, Monkey Nut or Pea-nut, is nearly always mentioned at the same time on account of a supposed similarity. This similarity is, as has been aptly stated, "more superficial than otherwise," and practically begins and ends with the low-growing habit of its trifoliate leaves and the bearing or ripening of its seed under the surface of the soil. This reference to the two so-called "ground-nuts" together, coupled with the unfortunate multiplicity of names, gives rise sometimes to considerable confusion.

On one occasion I found a settler in the tropics of this State, and a native of Mauritius, growing what he called a "pistache" nut among coffee, which from information concerning *pistacia* gleaned from his books of reference he was confidently anticipating would ultimately grow into a tree and shade his coffee, and who became quite indignant when I tried to explain to him that what he had was *Arachis hypogea*, and not the *Pistacia vera* he had obviously confounded it with.

The term "Ground Nut" also is very misleading when used in connection with the fruit or seed of either *Voandzeia* or *Arachis*, and still more so when used in connection with the pear-shaped tubers of the *Apios tuberosa*. In both of the two former the pericarp is at least structurally dehiscent, though when dried or stored the shell may not naturally split or discharge its seed, while true nuts are essentially indehiscent. With the common Pea or Ground Nut (*Arachis*) there may be some excuse for maintaining the term "nut," on account of immemorial custom, a frequent method of consumption similar to that of most nuts, and a further similarity again in flavour; but with the *Voandzeia* no such excuse exists, as the seed is generally cooked and eaten like beans, peas, or lentils, long-established custom can hardly be claimed in its favour, the only similarity to a nut is in a hardness of its endocarp, and it is also, according to Burkill, much more nearly allied to the true Haricot Bean than the *Arachis*.

Plate XXXV.



FIG. 1.—Plant of the Bambarra Ground Bean at the Kamerunga State Nursery.

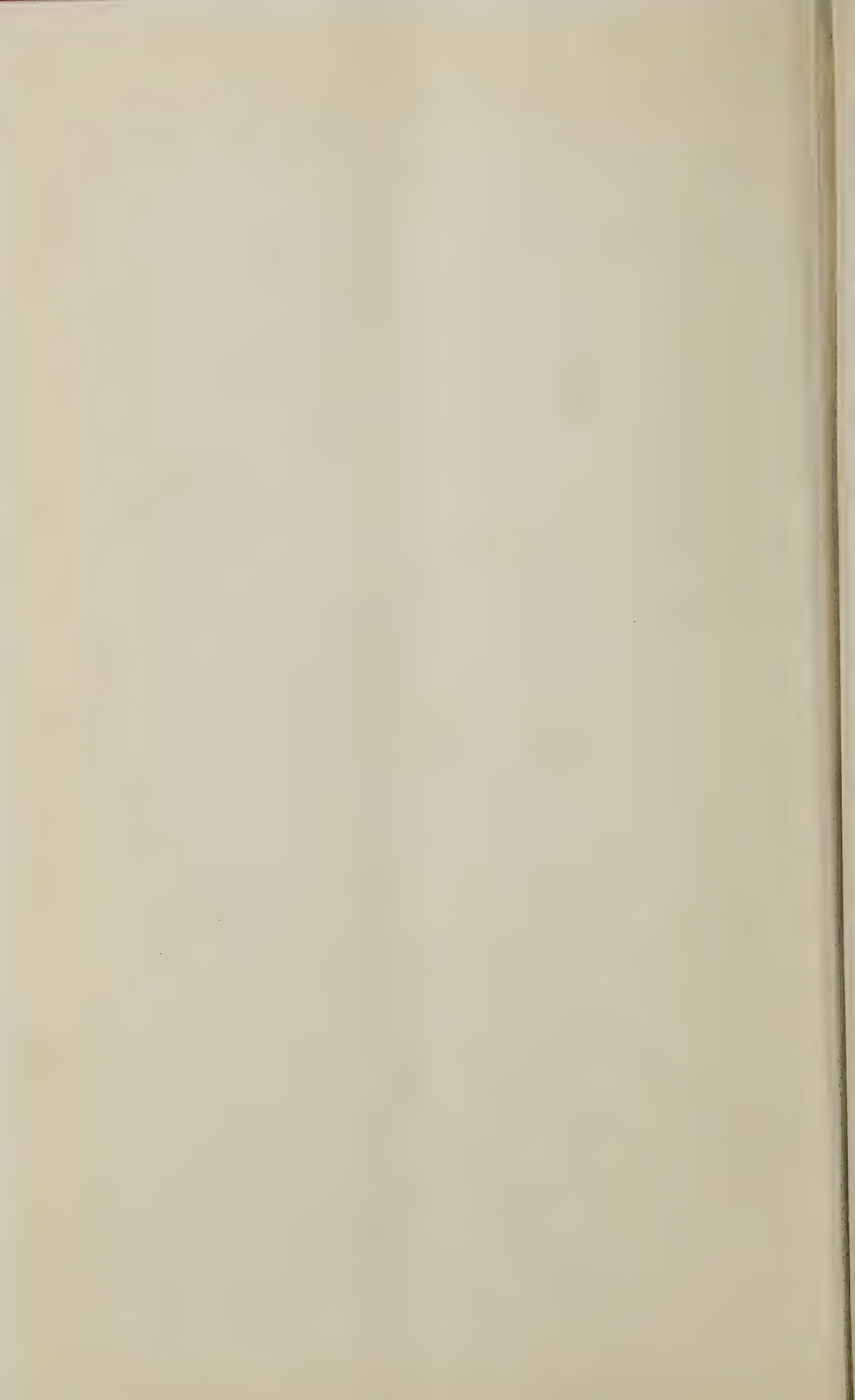


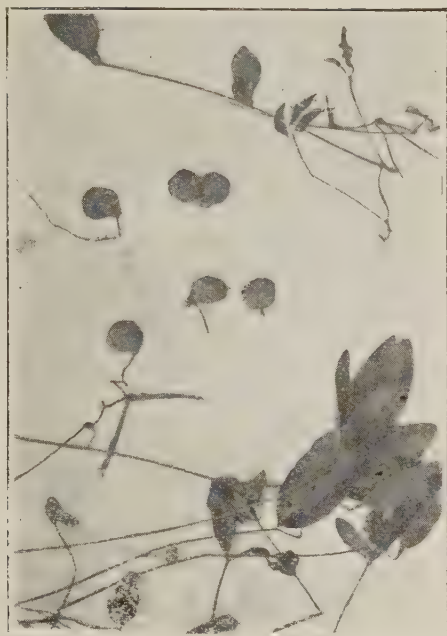
Plate XXXVI.

FIG. 1.—Double Pods, Abortive Pairs, and Shape of Pedicels of the Bambarra Ground Bean.



FIG. 2.—Nitrogenous Nodules on Roots of the Bambarra Ground Bean.

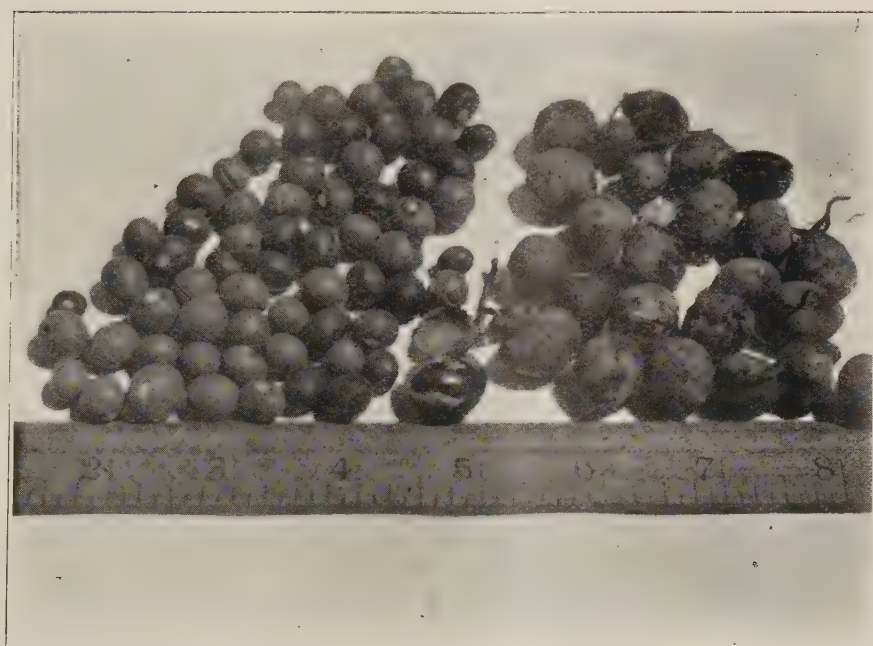


FIG. 3.—Bambarra Ground Beans, Shelled and Unshelled.

Hence it would seem that the term "Bambarra (or African) Ground Bean" would be both more correct and appropriate, as well as being less liable to create confusion.

As an addition to the interesting article on this economic plant recently appearing in this Journal above referred to, the following notes regarding its cultivation, growth, and behaviour generally in the tropical parts of this State will be of interest, especially if similar experience of it in the sub-tropical or temperate parts of the State can also be quoted for comparison.

In the descriptive article on this plant, in the "Kew Bulletin," by I. H. Burkill, M.A., F.L.S., Reporter on Economic Products to the Government of India, he says:—"As the name 'Ground Nut' implies, the seeds mature underground. To facilitate the necessary burial of the pod—for none mature that cannot bury (Correa de Mello in Journ. Linn. Soc., XI., 254)—the short, somewhat flattened, hairy branches lie prone on the surface of the earth, often penetrating it where soft and always dipping downward at the tip. On the primary and a few of the secondary branches are a few leaves, large, erect, and trifoliate. The inflorescences, either terminal or from the axils of the leaves, are two-flowered, and invariably penetrate the earth unless prevented by some solid body. The flowers thus produced underground—one on each side of a wart-like termination to the axis—may remain subterranean or may reach the surface by the elongation of the pedicel and open as small pale yellow pea-like blossoms. In fruiting the ovary is drawn underground. The subterranean flowers, provided like the aerial with pedicels, lie folded on to these and do not develop any of the conspicuous parts; their petals are absent, and so reduced are the stamens that observers have thought them female."

One of the most noticeable differences between the *Voandzeia* and the *Arachis* is in the length of the petiole or leaf stalk, some of which in the plants grown at the Kamerunga State Nursery were 11 to 12 in. long. The branches or runners from the main root of the plant lie very close to the surface of the ground, which gives the whole stool a rather squat appearance compared with the *Arachis*, which has many raised branches or terminal shoots, and generally thicker foliage. These runners extend to a distance of about a foot from the main stool, and root freely every 3 to 6 in. Each plant (from one seed only) when full grown here, covered a circle of roughly some 2 ft. in diameter. Beans were found clustered mainly around the centre root of the stool, but also in a lesser degree along the runners. These runners have quite bare stems between the nodes that root, but they do not root at every node apparently. Where a node has rooted, however, a cluster of leaves is produced and inflorescences occur. The plants here were found to flower freely above ground, and while some of the flowers were somewhat pale most were of a deep and distinct chrome yellow.

After pollination the young beans are long and pointed, with a distinct curve at the sharp end, reminding one very much of the "sting" at the end of a scorpion's tail. As these mature they increase but little in length in comparison to their increase in girth, until when ripe the once pointed end of the pod is hardly discernible. There would seem no doubt that the pedicels of the beans increase very much in length after fertilisation takes place, and assist if they do not actually force the young and pointed embryo bean into the soil. Should the ground have set somewhat hard by rain or other causes this pedicel or stalk has been found to fold or even twist like a corkscrew. A specimen of this is shown in Fig. 1 of the illustration. Generally, however, the pedicel

is fairly straight and from 1 to 2 or $2\frac{1}{2}$ in. long. Beans have been found at a depth of 3 in. in free soil.

Sometimes two beans are found on one pedicel, but never yet two seeds in one pod. It would appear, since no double-podded pedicel has been seen above or just entering the surface of the soil, and from a careful examination of the plant in all stages of growth, that the aerial flowers generally, if not always, produce but one pod and the double podded pedicels blossom subterraneously. In the specimens here double pods were not common, and, where occurring, the pods were always opposite each other. Sometimes a minute second pod was observed, with the germ apparently atrophied and about the size of a pin's head, while the other was full grown; otherwise the two beans on the same pedicel were always of about the same size and seemingly of the same age. (See Fig. 1, Plate II.).

The pericarp is a dirty—and sometimes creamy—white; tough, but much more brittle and very much less fibrous than that of the *Arachis*, and always clinging closely to the seed.

The juncture of the two valves can be clearly seen in a fresh pod, and is often depressed. When dried and rolled between the hands the pods will readily open at the juncture, but as the shell fits round the seed so tightly it will not readily do so when fresh, and especially if not quite ripe. The seed are usually from $\frac{3}{8}$ in. to $\frac{1}{2}$ in. in length and almost as broad, frequently as nearly spherical as possible. The hilum is white, slightly raised, and very distinct. The seed vary considerably in size, and even more so in colour; purplish red, bright red, brown, black, cream, and mottled seed having been obtained from the same plant. When fresh the endocarp is soft but somewhat tough; when dry it becomes remarkably hard without, however, becoming as brittle as might be expected. In the illustration the beans on the right are in the pods and as dug out of the ground; on the left are the shelled seed, fresh and dried together. The freshly shelled seed are slightly darker in colour than the dried ones. If fully ripe the seed does not wrinkle, and shrinks but little on drying.

July to August has been found the best time here to sow the Bambarra Ground Bean. It was rather slow in germinating, possibly on account of its hard endocarp, and the process might be accelerated by soaking. In ten days to a fortnight the seedlings usually show up. Well-worked soil, free and with a fine seed-bed, is necessary, and rows about 2 ft. apart, or double rows 1 ft. between and 3 ft. apart, are advisable. One or two seed may be set every foot or so for a good stand, and covered to a depth of about an inch if the soil is harrowed finely and the weather not too dry. It takes three to four months to mature, when, ordinarily, the leaves will begin to turn yellow and fall, which is the main indication of their ripeness and readiness for harvesting. Should moist or wet weather be experienced, however, it was found at Kamerunga that the plant did not die back, but made new growth, some of the mature seed began sprouting in the ground, and a fresh flowering took place. This is to be avoided if possible, however, though the plant under such circumstances will continue green and growing for many months, in some cases right through the wet season. On the whole, however, the *Voandzeia* was found to dislike heavy rain or protracted wet weather, and to suffer therefrom to a far greater extent than the *Arachis*.

Hilling up was not tried, as for so low-lying a plant it would have involved the burying of the greater part of the whole plant and many leaves.

In harvesting the beans are found at varying depths, though the bulk of them were, as previously stated, round the main stool and only an inch or so deep. Except in very free or light sandy soil the experience here was the reverse of that in Mauritius, and when pulled up most of the beans were found to be left in the ground, far less adhering to the roots than is the case with the *Arachis*.

The past season in North Queensland has been too wet a one to enable any satisfactory records to be made of the amount of returns, but it has been noticed so far, on every sowing, that the returns have been materially less than, indeed are not to be compared in quantity with, the common pea-nuts grown beside it.

Regarding pests the *Voandzeia* have been fairly free. There is no doubt that rats and similar vermin are fond of the seed, and in a few instances nematodes were observed to have attacked the pericarp of the bean, but no nematode nodules were found on the roots. The leaves were attacked by grass-hoppers, small beetles, &c., in common with other adjacent and similar annuals, but not to any noticeably greater or lesser extent. The dry seed seemed to be distinctly less liable to attack from weevils than many seed, possibly on account of the hardness of the shell, though they were not entirely exempt in this respect.

Nitrogenous nodules were looked for and found in fair quantities, mostly on the small fibrous roots on the outside of the main stool and on the rooted nodes of runners. (Fig. 2, Plate II., shows some of these.)

I. H. Burkill, in the "Kew Bulletin," after quoting Baron von Müller's record of the *Voandzeia* having produced a particularly rich crop, according to M. Holtze, in the Northern Territory (Arnheim's Land) adds: "But nowhere has its cultivation assumed any large proportions." Despite the fact of the bean showing on analysis that it constitutes in itself almost a perfectly balanced ration, it would not seem likely to become popular or be cultivated to any extent in this State. As a legume for cultivation among cane, as suggested in the Mauritius report, it is far too slow-growing, and produces comparatively few nitrogenous nodules, and would probably prove too great an attraction to rats, bandicoots, and such vermin. As a human food it is not sufficiently distinctive in flavour or attractive enough to become popular for any but a cheap living Oriental race, even were it grown in sufficient quantities to be plentiful.

The lines along which the Bambarra Ground Bean, at any rate in the tropical parts of this country, might be of economic use are as food for stock and pigs. If sown in hills in sandy or free soil plots, in pig paddocks, or in fields during the last hoeing of such crops as maize, they would be ready for consumption and materially add to the amount of fodder when the stock was turned into the stubble, and pigs would root up the beans for themselves. But even in this respect the experiments here indicate that it does not compare with, and would not pay so well as, the Pea-nut (*Arachis*) or Cowpea.

PARA RUBBER SEED KERNELS AND OIL.

"The Planters' Association of Ceylon" (says the "Planters' Chronicle," 1st April) "has received a letter from Professor W. R. Dunstan, Imperial Institute, on the above subject, to which considerable interest attaches," and we publish it here, as it points to the possibility of a future industry for Queensland when our tropical Northern lands

not devoted to sugar will be largely planted with rubber. The letter published in the "Planters' Chronicle" reads as follows:—

"I desire to draw the attention of your association to the favourable opportunity which exists at present for placing supplies of Pará rubber seed kernels or oil on the European markets.

"Investigations conducted at the Imperial Institute have shown that Pará rubber seed oil is suitable for technical use as a substitute for linseed oil and similar drying oils, and technical trials with the oil conducted by manufacturers at the suggestion of the Imperial Institute have afforded conclusive confirmation of this view. Full information on this subject is given in the "Bulletin of the Imperial Institute," Vol I. (1903), p. 156; Vol. II. (1904), p. 22; and Vol. VII. (1909), p. 95.

"Owing to a variety of causes, such as the failure of crops and the application of certain oils to new uses, there is at present a great scarcity of oil seeds and oils in Europe, and for some time past the prices of these seeds have been rising steadily. Linseed oil, which was worth £31 10s. per ton a year ago, is selling at £41 per ton at present. It is probable that Pará rubber seed oil would fetch about the same price or possibly at first a little less than linseed oil, and it seems likely that Pará rubber seed kernels would now realise more than the £10 per ton at which they were valued in 1903. In considering export, there are several questions to be considered.

COST OF COLLECTION.

"In an article contributed to a recent number of the 'Journal d'Agriculture Tropicale' (September, 1910), Mr. Petch, of Peradeniya, Ceylon, expresses the opinion that the cost of collecting the seeds, which he estimated at 4d. per 1,000, would render export of the kernels unremunerative. The estimate of the cost of collection appears excessive in view of the statement made by the Director of Agriculture for the Federated Malay States, in his report for 1908, that the seeds could be probably collected at 4 cents (1d.) per 1,000. Further, as indicated above, it should be remembered that well-prepared kernels will probably fetch, at present, more than the £10 per ton which Mr. Petch assumes as their value in Europe. There seems to be no reason why the collection should not be managed by children.

"It is useless to attempt to export unshelled seeds. The shells form at least 50 per cent. of the whole seeds, and are of no economic value, so that they add very considerably to the cost of the freight, and in addition have to be removed before the kernels can be used for the expression of oil. The question resolves itself therefore to exporting (a) *shelled kernels* or (b) *expressed oil* and possibly "cake." For the preparation of the former, shelling machinery will probably be needed. There is no perfectly satisfactory shelling machine for these nuts on the market, but trials made at the Imperial Institute show that Miller's Nut-cracking Machine, sold by Messrs. Miller Brothers, Limited, of 43 Beaufort street, Liverpool, gives fairly satisfactory results.

"When this machine is used, the broken shells have to be picked from the kernels by hand, but this work can be done quite well by children. The machine should be driven at such a rate as will serve to break the shells, but not damage the kernels, as the latter deteriorate rather rapidly when broken. The machine may be seen at work at the Imperial Institute. The shelled kernels should be thoroughly dried in the sun, or by artificial heat as rapidly as possible, and then shipped in bags. Under these conditions, it is believed that they will travel well.

"The preparation and export of oil is a larger question than the separation and export of the kernels, since special machinery would be needed.

"The actual price obtained for the kernels of Pará rubber seed in Europe will depend eventually to some extent on the value of the cake left after the expression of the oil. Analyses of this cake made at the Imperial Institute show that it is probably at least equal in feeding value to linseed or cotton-seed cake, but so far it has been impossible to obtain sufficiently large supplies of the cake to permit of feeding trials with cattle being undertaken, and until this has been done nothing definite can be said as to the suitability of the cake for feeding purposes. Moreover, the cake has been found at the Imperial Institute to yield small quantities of prussic acid. This is, of course, also true of linseed cake, but the fact makes it very important that feeding trials of Pará rubber seed cakes should be made at the earliest opportunity. In Ceylon it is certain that the cake would be valuable as a manure.

"Inquiries have been received recently at the Imperial Institute from manufacturers desirous of obtaining supplies of Pará rubber seed kernels or oil, and from this and the facts quoted above it seems certain that consignments of these products in good condition would meet with a ready sale. I shall be glad, therefore, if your association will reconsider the whole question and inform me as to the possibilities of the suggested industry."

THE PROPAGATION OF CEARÁ RUBBER IN DRY COUNTRIES.

The Royal Botanic Gardens, Kew, have been experimenting with Ceará rubber; and the following article on the subject has appeared in a late Bulletin of Miscellaneous Information :—

1. The plant is readily propagated both from seeds and cuttings. Seeds are abundantly produced in almost every part of the world where the plant has been introduced. They may be gathered from plants when only three to five years old. Therefore there is the great advantage that a large area could be planted within a comparatively short period. Sowing the seeds in the position where they are to grow permanently is universally adopted in Brazil. It is possible, if adopted elsewhere, this plan would greatly reduce the cost of establishing plantations.

2. The Ceará rubber plant is very hardy, a fast grower, free from insect and fungoid attacks, requires little or no attention when once established, and thrives in poor, dry, and rocky soils, unsuited to almost any other crop. It is evident, however, that the yield of a few trees cannot be remunerative, and only large areas can hope to make the industry a paying one.

3. It produces a good class rubber, second only, when well prepared, to the best Pará rubber. For this there is a steady and continuous demand. The yield per tree is apparently small, but a return is obtained earlier than from any other rubber plant. With thick planting and judicious thinning as the trees grow up it may be possible to increase the yield hitherto recorded; whilst with skilful treatment the permanent trees may be tapped twice yearly, and last in a productive state for fifteen to twenty years.

4. In spite, therefore, of the apparent want of success which so far has attended experiments with Ceará rubber plants in Ceylon and other countries, the increasing importance of rubber as an article in large

demand in all civilised countries at good prices, suggests a reconsideration of the merits of this interesting plant. In many of our colonies possessing a dry climate and a poor, stony soil, it is possible that large areas could be profitably occupied with Cear  rubber trees, so grown as to provide annual crops for tapping.

Manihot Glaziovii, by the way, is derived from Dr. Glaziou, who sent specimens of this variety to Kew from Rio.—“Tropical Life.”

A 30-H.P. COTTON-PICKING MACHINE.

The greatest obstacle in the development of Southern agriculture has been the necessity of utilising hand labour in gathering the cotton crop. A large portion of the negro population—men, women, and children—are employed during the harvesting season picking open bolls by hand. This necessitates a very great needless expense to the planter for producing his crop, and it is attended by a large percentage of waste, since the negroes frequently pluck unripe bolls which must be thrown away as useless.

Remembering that the Southern cotton crop supplies a very large proportion of the raw material for European mills in addition to the bulk of raw material for American textile industries, any plan which will reduce the cost of cultivation and harvesting is of great importance. The inventor has had his attention turned to this for a number of years, and various devices have been patented and constructed to take the place of hand labour in picking the cotton. Until recently, however, all have been unsuccessful.

Mechanism has at last been invented which appears to solve the problem of harvesting cotton by machinery, as the harvester operated by steam, gasoline, and horse power performs the work on the wheat farms of the West, one of them doing the work of a hundred or more human labourers. There is an important difference between picking cotton and harvesting the grain. The grain harvester goes over the field cutting down every stalk. The cotton machine is so adjusted that it picks only the bolls that are ripe or fit for harvesting and leaves those which are not matured. In one field a month or more may elapse before all of the plants are ready for picking, and for this reason it is necessary to cover the ground at least twice by the machine, which operates so rapidly and is so efficient that the percentage of ripe cotton left after the machine has done its work is so small as to be insignificant, as compared with the great waste which results from careless picking by the negroes. The machine picks about 10 lb. of seed cotton per minute, or 6,000 lb. per day of ten hours, if kept running continuously, or 5,400 lb. per day, allowing 10 per cent. for stoppage. The quantity picked varies somewhat, depending on the amount of ripe cotton on the plants, but the above amount may be considered as a fair average. On the first trip it gathers 90 per cent. of the ripe cotton, and the remaining 10 per cent. is picked on the second trip.

An average of 30-h.p. is required to operate this interesting cotton picker. A gasoline motor of 30-h.p. is usually installed for the service. Beneath the engine are what are termed two picking attachments swung under it, and a pair of canvas bags hung out behind. It moves over the field as fast as a man walks, the wheels passing along the spaces between the rows of plants. The cotton is picked over by the revolving steel

Plate XXXVIII.



Cotton Picker Moving between the Rows.

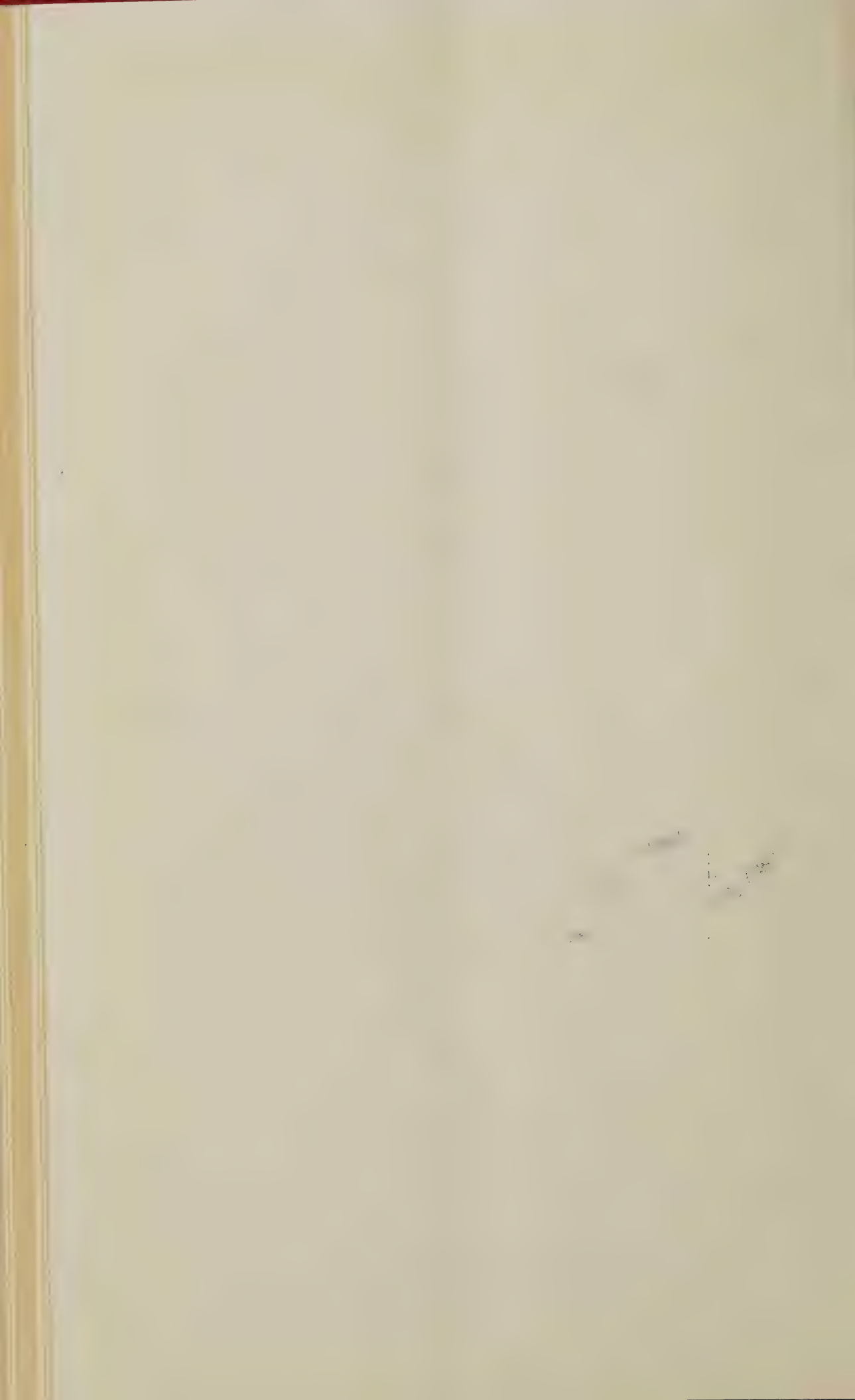
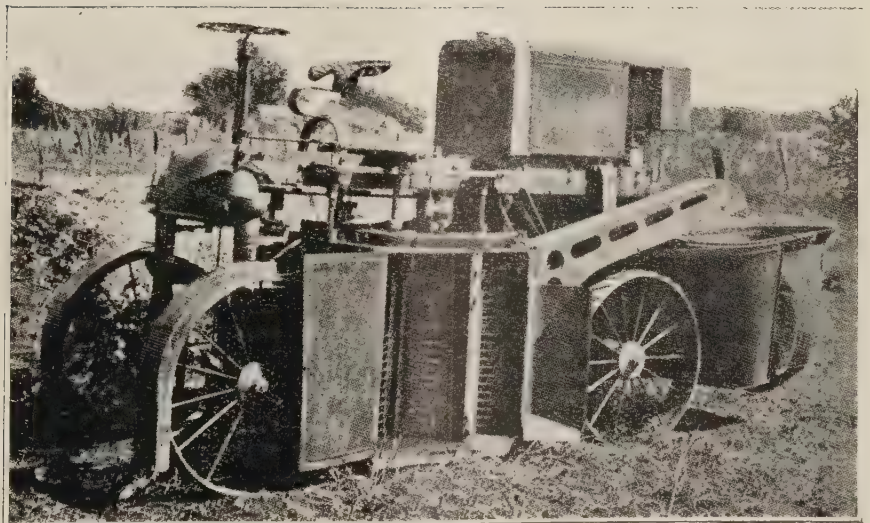


Plate XXXVII.



The Modern Cotton Picker in Operation.



Cotton Picker with Casing Opened to show the Mechanism.

fingers which catch the lint but leave the plant uninjured, so that later bolls may mature. The picking machinery is on two drums which hang from the frame of the tractor.

An endless chain of upright cylinders of small diameter follow each other around the drum. From these cylinders the needles or spindles which do the picking project horizontally into the plant. In operation each part has its individual movement. The drum carries the cylinders around; the cylinders force the needles into the plant at the proper angle, to twist and catch the cotton.

Every motion is delicately adjusted. While the needles move fast enough to catch the fibre, their speed is not fast enough to throw it out of the receiver. The cylinders bring each needle into place at the proper time, so that there is never a space large enough for an open boll to pass through without being stripped of its contents. The drum is moving backward at the same rate that the whole machine moves forward, so that the picking needles do not move horizontally through the plant, but merely turn in it. In the cylinders of each picker are no less than 816 of the steel fingers which harvest the cotton. But one man is required to operate the engine, while he also steers the mechanism. A boy may be employed to sit in the rear to see that the cotton is all deposited through the conveyer into the storage bins; but, unless the bolls are thick on the stalk, all of the cotton is stored mechanically.

Tests have been made of the new cotton picker in several different States, while it is being operated extensively in the Texas fields. These tests of capacity and thoroughness were carried out by experts of the Agricultural Department, as well as the farmers themselves who are operating it, as contrasted with hand labour.

The pickers do not engage the imperfectly developed cotton of diseased bolls, but they frequently pick the flocculent cotton from one side of an open boll but have not force enough to pull out that clotted or glued in imperfectly developed lobes. This is one of the most important features of the cotton picker.

As to the cost of operation, the maximum expense does not exceed 5 dollars a day, including the wages of the man and boy, and a gallon of gasoline consumed every hour for a day of ten hours. This is the average outlay as shown by calculations made in Texas and other portions of the South. As a result of this investigation it has been calculated that it gathers 95 per cent. of the open cotton, actually picking from 550 lb. to 900 lb. per hour, according to the amount of cotton on the stalks and the rate at which run. This is more than the original estimate. Except for a few green leaves, the cotton is as clean as, if not cleaner than, that hand picked.

This remarkable invention may be called the life work of Angus Campbell, a Scotch inventor, who for many years has lived in Texas and has made a study of plans to economise the gathering of cotton by portable machinery. Mr. Campbell has worked on his plans for over twenty years, and made over fifty-five designs. In every case, however, with the exception of the present model, some defect has been found in operation which prevented the cotton picker from being of practical use. Enough of the latest type, however, are now in operation to show beyond question that the present model is remarkably efficient, and that it has many advantages over the old hand-picking method, not only in reducing the expense but in lessening the time of harvesting a field and in performing other operations, while it is so constructed that it is extremely durable and can be operated for an indefinite time.

This method of harvesting the cotton has naturally interested the textile manufacturers, especially the experts of New England cotton mills. The question has naturally arisen to what extent, if any, the cotton fibre has been broken or otherwise injured by being pulled out by the needles instead of fingers. Examinations have been made of cloth in the various stages of manufacture at the Wamsutta as well as several other mills. A bale of hand picked and a bale of machine picked were passed through this textile plant, and the conditions were fully studied. When the cotton reached the mill it was decided that the machine picked cotton was slightly higher in grade than the hand picked cotton. The cotton in both cases was then passed through from the raw state to the woven cloth. In the picking, carding, and other departments, the percentage of waste was the same to a fraction, frequently. In the spinning there was no greater breakage in the machine picked than in the hand picked. The machines were operated, the rollers set, and the twist was the same in both instances. The breaking strength of the yarn showed a fraction stronger, one or two pounds stronger, in the machine picked staple. The fibre used was 1-inch to $\frac{1}{16}$ -inch cotton spun in twenties. It broke at a pull of one or two pounds more than the hand picked cotton presented. In examining the yarn it was found to be equal in quality to the hand picked staple. After the yarn was spun it was woven, and an examination showed no difference whatever in the appearance of the cloth in any respect. After it was woven it was bleached, and in the finished state the machine picked cotton again showed slightly better than the hand picked. The cotton was also subjected to a microscopical test to see if any fracture of the fibre could be discovered. None whatever was discovered.

PROPOSED NEW SUGAR MILL ON THE LOWER BURDEKIN.

In the report of the Central Sugar Mills Commission, it was recommended that unless the Government received assurances before 31st December next, that a mill would be erected in the Burdekin district by private enterprise, as the Commission had reason to believe would be the case, a mill in this locality should be added to the other recommendations contained in the report. We are (writes the "Australian Sugar Journal," 4th May) now in a position to state that the establishment of the projected mill by Mr. Drysdale is fully assured; and that steps are being taken for the early erection of a mill capable of turning out 10,000 tons of sugar in a season.

In the course of his evidence before the Sugar Mills Commission, Mr. John Drysdale is reported to have said: Both the Pioneer and Kalamia Mills were practically working to their full capacity, but he was under an agreement with the Government to erect another mill at Inkerman, on the other side of the river from Jarvisfield. The arrangements he made for a new mill included Jarvisfield, as the Government was going to build a railway bridge across the river. The new mill was to be of 15,000 tons capacity, and would be ample for all the cane grown for a good many years. His idea was to have the cane at Jarvisfield to give the mill a start while the land on the mill side of the river was being prepared. The Government was anxious to push on the bridge, and the machinery would be ready as soon as the bridge was built. He expected the mill would be erected for the season of 1913. He intended to have as much of the machinery as possible made in the Commonwealth.

Chemistry.

INSECTICIDES.

Commercial Arsenate of Lead.

By J. C. BRÜNNICH AND F. SMITH.

Analyses of insecticides on the Brisbane market were published in the "Agricultural Journal" for December, 1909, and included that of arsenate of lead paste. This year further analyses have been made of these preparations and also of that in powder form, which is of more recent introduction. The results of the examination have been tabulated, as heretofore, to show the contents of lead and arsenic, the constituents upon which the insecticidal value of the arsenate of lead depends.

Physical Condition of Arsenate of Lead.

Obviously, however, the value of any specimen of lead arsenate depends also upon the leaf area a given weight will cover, when applied as a spray. The covering power of any material depends upon the fineness of its particles, as is made evident upon the simple consideration that a given weight of stone will cover a greater area when spread in form of fine gravel than when as coarse pebbles.

Analyses of commercial lead arsenates hitherto published, and most recently by A. A. Ramsay ("Agricultural Gazette" of N.S.W., vol. xxi., p. 955), have regard to the "settling property" of the material, which will indicate to some extent its state of division. On account, however, of the difficulty of judging the amount of material remaining in suspension at any particular moment, and since evidence of "fineness" may be obscured by the action of coarser particles carrying down the finer material in a single subsidence, it seemed to us better to resort to the sorting action of running water, and the samples were submitted to **elutriation** in a Schöne Elutriator, an apparatus usually employed in the mechanical analysis of soils. The figures obtained, showing the percentage of material carried over by a current velocity expressed in millimetres per second (Table III.), though not taking into account a possible variation in specific gravity of the original product, clearly distinguish sample of extra fineness, such as Swift's and Blyth's, from those of coarser texture, and therefore less covering power, such as Star and Platypus brand. A. A. Ramsay (*loc. cit.*) determines the "apparent specific gravity" of the dried powders, finding variation in this value from .6 to 2.2, without, however, showing dependence of the settling property upon this value, since one of the highest and one of the lowest gravity show similar behaviour in subsidence. We determined the **true specific gravity** of the dried powders in some cases, finding a variation from 4.6 to 5.6, but are aware of the fact that this specific gravity of the dried material does in most cases not strictly represent the true specific gravity of the compound actually in suspension.

Contrary to American experience with regard to the action of water supplies upon the solubility of the arsenic in the lead arsenate, we found that 3 litres of tap water passing through the elutriator (containing 40 grammes of the dry material) contained only faint traces of both lead and arsenic.

Chemical Composition of Arsenate of Lead.

The samples show in the main the usual composition of commercial arsenate of lead preparations. (Table I.) They are free from arsenite,

which is stated to be less effective as an insecticide, and also free from soluble arsenic compounds, which would be poisonous to the plants. We must draw attention here to the fact that the remark as to the respective value of arsenates and arsenites as insecticides does not apply to the destruction of the cattle ticks, in which case we find arsenates possessing almost no killing power.

The "Star" brand paste and powder are evidently less carefully washed free from excess of lead compounds and bye-products than the majority of samples; it cannot be contended, however, that an excess of lead and sodium salts exerts an injurious action on the foliage. In the proportion of lead oxide and arsenic oxide the samples conform to two types—the proportions of these constituents in the dried powders conforming either to the composition of lead pyroarsenate ($\text{Pb}_2\text{As}_2\text{O}_7$), containing 65.98 per cent. PbO and 34.02 per cent. As_2O_5 , derived from the mono-plumbic arsenate (PbHAsO_4) on drying, or to tri-plumbic arsenate ($\text{Pb}_3(\text{AsO}_4)_2$), containing 74.4 per cent. PbO and 25.6 per cent. As_2O_5 .

(di) The composition of any sample of lead arsenate will undoubtedly depend upon its mode of manufacture—the materials employed, temperature, concentration of the solutions, and method of mixing (U.S.A. Department of Agriculture, Bureau of Chemistry, Bulletin 131). Kirkland (Agriculture of Massachusetts, 1897, p. 386) has shown that mono-plumbic arsenate is slightly more poisonous than tri-plumbic arsenate. This may be due to the fact that the former has a larger percentage of arsenic, and therefore a smaller quantity would have the same effect. It is possible, however, that the lead would also possess some poisonous properties, and therefore the larger percentage of lead in the one may somewhat affect the larger amount of arsenic in the other.

The composition of the "Blue Bell" brand differs in the present analysis from that previously published in this State, and conforms with the first-mentioned type. The "Platypus" preparation contains considerably less water and more arsenate of lead than in the sample previously analysed, though in this case, as in the "Star" brand powder, as tri-plumbic arsenate, the second type, for which reason the toxic properties of these preparations are not strictly comparable with that of the others on the basis of arsenic contents alone.

As in the previous article ("Queensland Agricultural Journal," December, 1909), the actual cost of the various preparations computed from net weights, cost and arsenic contents are given on Table II. A spray containing .1 per cent. of arsenic oxide is the strongest application recommended, and for many purposes a much weaker spray, one-third or one-half this strength, may be used. The cost per 100 gallons of spray is calculated on the basis of cost of the compound in 50-lb. kegs.

Analyses of the Elutriation Fractions.

With the object of further elucidating the composition of the arsenate of lead preparations, the collected fractions from elutriations were analysed. (Table III.) A recent review of the subject (U.S.A. Bulletin, 131, p. 17) states, "arsenate of lead may mean any of the various lead arsenates, but the most common ones are the tri-plumbic arsenate and plumbic hydrogen arsenate. Most of the commercial samples consist of the mixture of these two, the one predominating on the method used in its manufacture."

In the analyses of the elutriation fractions it will be noticed that in some cases the lighter and finer portions contain a higher proportion of arsenic oxide, their composition approximating to that of plumbic

pyro-arsenate derived from plumbic hydrogen arsenate present in the undried material. The coarser material approximates in composition to tri-plumbic arsenate. Commercial arsenate of lead may therefore be a heterogeneous material, the compounds of which—in some cases plumbic hydrogen arsenate and tri-plumbic arsenate, the former preponderating—may be separated more or less perfectly by means of elutriation.

(di) Blyth's "Blue Bell" brand, however, showing constancy of composition in its fractions, is composed almost entirely of plumbic hydrogen arsenate, whereas "Star" powder and "Platypus" brand are tri-plumbic arsenate. The "Electro" preparations, however, from the calculated composition of the finest fraction, are shown to contain a third compound, not hitherto noticed, probably of the formula $PbH_2As_2O_7$, mono-plumbic pyroarsenate, or $Pb(H_2AsO_4)_2$, a plumbic bi-arsenate, which in the dried material appears as plumbic meta arsenate $PbAs_2O_6$ containing 49.2 per cent. PbO and 50.8 per cent. As_2O_5 . The relative insecticidal value of this compound cannot be stated, though its higher arsenic content should render it more toxic, weight for weight, than mono-plumbic or tri-plumbic arsenates.

Table I.—Composition of Commercial Arsenate of Lead.—Powders and Pastes.

An.No	Brand.	Water.	Lead Oxide, PbO.	Arsenic Oxide, As_2O_5 .	Water Soluble Impurities.	Lead Oxide in Pure, Dry Material.	Arsenic Oxide in Pure, Dry Material
		%	%	%	%	%	%
755	Vreeland's Electro Paste* ...	33.99	41.70	22.32	.40	65.14	34.86
773	Do. do. Powder* ...	.60	63.33	33.59	.30	65.35	34.65
853	Swift's do. Paste* ...	48.55	33.50	17.00	.60	66.34	33.66
900	Blyth's Bluebell Paste* ...	46.38	33.90	17.24	2.20	66.35	33.65
1491	Bryce, Roberts, and Co.'s Star Paste	59.05	25.66†	12.33	3.38	67.26	32.74
1492	Do. do. do. Powder	1.35	47.54‡	17.42	24.63§	72.04	27.96
1662	Platypus Paste* ...	51.21	35.10	11.10	.48	76.00	24.00
	Theoretical Composition of Lead Pyroarsenate, $Pb_2As_2O_7$	...	...	...	...	65.98	34.02
	Theoretical Composition of Tri-plumbic Arsenate, $Pb_3(AsO_4)_2$	...	...	...	...	74.40	25.60

* Water soluble lead and arsenic compounds, nil ; arsenates, nil.
† Containing .40 % water soluble, PbO ; water soluble arsenic compounds, nil.
‡ Containing 2.67 % do. do.
§ Chiefly sodium nitrate.

Table II.—Comparative Costs of Commercial Samples.

—	Net Weight of Preparation in 1-lb. Jar or Package.	Containing Ounce of Arsenic Oxide.	COST OF 1 PER CENT. OF ARSENIC IN PENCE.			Cost of 100 Gallons of Spray, containing 1 per cent. of Arsenic.
			1-lb. Jar.	50-lb. Keg.	Cheapest Rate for Large Quantities.	
	Oz.					s. d.
Vreeland's Electric Paste ...	19½	4.35	.806	.470	.359	3 11
Ditto Powder*	15	5.04	...	...	...	...
Swift's ...	16	2.72	1.41	.766	.706	6 5
Blyth's Bluebell ...	16	2.76	.638	.435	.422	3 7
Star Paste ...	Not in original package {	...	.708	.568	.486	4 9
Star Powder ...		...	.690	...	.560	4 8
Platypus ...		21	2.16	1.17	1.08	9 0

* Not at present on market.

Table III.—Physical Condition and Composition of Elutriation Fractions.

An.No.	Brand.	Rate of Waterflow in M.M. per Second.	2.	5.	9.	14.	20	33	Residue.	Spec. Grav. of Dried Powders.	Rate of Settling.
755	Vreeland's Electro Paste...	Per cent. of water-free material carried over Composition of fractions { PbO As ₂ O ₅	% 20.2 (by difference) 56.45 43.55 (calculated) 26.0 by difference) 57.16 42.84	% 48.9 64.44 35.56 14.8 65.10 34.90 24.3 71.24 28.76 3.5	% Nil 19.6 65.82 34.18 Nil 1.6	% Nil 12.6 67.02 32.98 Nil 2.3	% 18.0 71.68 28.32 17.4 70.80 29.20 1.2 ... 4.6	% 9.1 72.16 27.84 2.4 75.00 25.00 1.0 75.35 24.65 1.4	% 3.8 7.2 Nil 6.5	4.66 5.05 5.55 4.70	Slow settling Medium settling Slowest settling Slow settling. Fast settling Fast settling Fastest settling
773	Do. do. Powder	Per cent. of water-free material Composition of fractions { PbO As ₂ O ₅	(by difference) 56.45 43.55 (calculated) 26.0 by difference) 57.16 42.84	64.44 35.56 14.8 65.10 34.90 24.3 71.24 28.76 3.5	 19.6 65.82 34.18 Nil 1.6	 12.6 67.02 32.98 Nil 2.3	71.68 28.32 17.4 70.80 29.20 1.2 ... 4.6	72.16 27.84 2.4 75.00 25.00 1.0 75.35 24.65 1.4	3.8 7.2 Nil 6.5	4.66 5.05 5.55 4.70	Slow settling Medium settling Slowest settling Slow settling. Fast settling Fast settling Fastest settling
853	Swift's Paste ...	Per cent. of water-free material Composition of fractions { PbO As ₂ O ₅	(by difference) 56.45 43.55 (calculated) 26.0 by difference) 57.16 42.84	64.44 35.56 14.8 65.10 34.90 24.3 71.24 28.76 3.5	 19.6 65.82 34.18 Nil 1.6	 12.6 67.02 32.98 Nil 2.3	71.68 28.32 17.4 70.80 29.20 1.2 ... 4.6	72.16 27.84 2.4 75.00 25.00 1.0 75.35 24.65 1.4	3.8 7.2 Nil 6.5	4.66 5.05 5.55 4.70	Slow settling Medium settling Slowest settling Slow settling. Fast settling Fast settling Fastest settling
900	Blyth's Bluebell Paste ...	Per cent. of water-free material Composition of fractions { PbO As ₂ O ₅	(by difference) 56.45 43.55 (calculated) 26.0 by difference) 57.16 42.84	64.44 35.56 14.8 65.10 34.90 24.3 71.24 28.76 3.5	 19.6 65.82 34.18 Nil 1.6	 12.6 67.02 32.98 Nil 2.3	71.68 28.32 17.4 70.80 29.20 1.2 ... 4.6	72.16 27.84 2.4 75.00 25.00 1.0 75.35 24.65 1.4	3.8 7.2 Nil 6.5	4.66 5.05 5.55 4.70	Slow settling Medium settling Slowest settling Slow settling. Fast settling Fast settling Fastest settling
1491	Bryce, Roberts, and Co.'s Star Paste	Per cent. of water-free material Composition of fractions { PbO As ₂ O ₅	(by difference) 56.45 43.55 (calculated) 26.0 by difference) 57.16 42.84	64.44 35.56 14.8 65.10 34.90 24.3 71.24 28.76 3.5	 19.6 65.82 34.18 Nil 1.6	 12.6 67.02 32.98 Nil 2.3	71.68 28.32 17.4 70.80 29.20 1.2 ... 4.6	72.16 27.84 2.4 75.00 25.00 1.0 75.35 24.65 1.4	3.8 7.2 Nil 6.5	4.66 5.05 5.55 4.70	Slow settling Medium settling Slowest settling Slow settling. Fast settling Fast settling Fastest settling
1492	Bryce, Roberts, and Co.'s Star Powder	Per cent. of water-free material Composition of fractions { PbO As ₂ O ₅	(by difference) 56.45 43.55 (calculated) 26.0 by difference) 57.16 42.84	64.44 35.56 14.8 65.10 34.90 24.3 71.24 28.76 3.5	 19.6 65.82 34.18 Nil 1.6	 12.6 67.02 32.98 Nil 2.3	71.68 28.32 17.4 70.80 29.20 1.2 ... 4.6	72.16 27.84 2.4 75.00 25.00 1.0 75.35 24.65 1.4	3.8 7.2 Nil 6.5	4.66 5.05 5.55 4.70	Slow settling Medium settling Slowest settling Slow settling. Fast settling Fast settling Fastest settling
1662	Platypus Paste ...	Per cent. of water-free material Composition of fractions { PbO As ₂ O ₅	(by difference) 56.45 43.55 (calculated) 26.0 by difference) 57.16 42.84	64.44 35.56 14.8 65.10 34.90 24.3 71.24 28.76 3.5	 19.6 65.82 34.18 Nil 1.6	 12.6 67.02 32.98 Nil 2.3	71.68 28.32 17.4 70.80 29.20 1.2 ... 4.6	72.16 27.84 2.4 75.00 25.00 1.0 75.35 24.65 1.4	3.8 7.2 Nil 6.5	4.66 5.05 5.55 4.70	Slow settling Medium settling Slowest settling Slow settling. Fast settling Fast settling Fastest settling

Animal Pathology.

CONTAGIOUS ABORTION.

Unusual interest was taken by farmers in a lecture on "Contagious Abortion of Cattle," by Professor W. T. Wilson, of the Harper-Adams College, Edgmond, Newport. He said that those who travelled in dairy impressed with the enormous monetary loss which breeders were experiencing from this scourge all over the kingdom. It was now proved that contagious abortion was brought about by the invasion of a special seed, and breeding districts and came in contact with farmers must be and that it was communicable from one animal to another by the transmission of the seed.

There were three paths by which cows could be infected—the alimentary or food canal, the respiratory or breathing canal, and the genital passage. Research had shown that of these paths of infection the second was the least likely, and the third the most dangerous, but the first must also be looked upon as a common source of entrance. Practical experience showed that from the third up to the seventh month of pregnancy was the commonest time for abortion. A cow might "pick" her calf once, twice perhaps, and then her third calf might be born in due season. The explanation of this was that the seed had been long enough in the animal to give it immunity, and therefore did not produce abortion any longer. This protection was better understood by bearing in mind the experience of infectious diseases in human beings.

The conditions existing in ordinary farm buildings much favoured the spread of the contagiousness of abortion. He blamed farmers seriously for the utter carelessness too often displayed concerning the disposal of the cleansings of cattle. He maintained, not from a scientific point of view, but as a practical man, that carelessness in the disposal of membranes, &c., even in the case of perfect calving, was to be condemned, and he reminded his audience that even savages had always set a better example. How simple it would be for the cowman to bury everything, including litter, under quicklime, so that there could be no chance of infection being carried to other animals! The common practice the lecturer satirised thus:—"Throw it on the manure heap, and let the warmth of the manure help to germinate the seeds of putrefaction; and then scatter them over arable and pasture land with the manure, so that they may be picked up by the cows as they crop the pasturage!"

There could only be one primary method of applying preventive measures to a contagious disease, and that was the separation of the diseased cows from those not infected. Upon that basis rested the whole question of prevention. Should a cow show signs of abortion, she should be removed at once, and kept in a properly disinfected box; quicklime, burying, and disinfection should follow abortion, and attendants on infected cows should not go near the sound herd, and newly-purchased in-calf cows should be kept separate until they had calved.

Tricks and practice which ought not to be carried on in a respectable community affected the spread of abortion. It was a very common thing for people, in order to rid themselves of a difficulty and to suppress aborting herd, or should be labelled if she had come from such a herd, with a calf from another cow, swapping calves, the two going as cow and

calf. Then there were certain things by using which those who were super-intelligent could deceive those who were not so tricky, and pass off a cow that had aborted as something else, the innocent purchaser taking the disease to his farm.

A great deal of evidence has been brought forward in support of the internal medication of carbolic acid as a cure for abortion. If he could, he would hold out every hope of the possibility of its service, but he could not. However they might saturate a cow by using carbolic acid through the digestive organs, they could not destroy the seeds of abortion in the womb, because if they used sufficient carbolic acid to reach the infection centres they would kill the cow.

Every person who had a case of abortion on his premises should be compelled by law to notify it for the benefit of others, for every cow sent to market should have a guarantee that she had not come from an aborting herd, or should be labelled if she had come from such a herd. They might think that was a tall order, but perhaps before they met him again they would have to put up with it. There was the interest of the general farming community of the country to be considered. They were constantly acting with others in sale and exchange, and to knowingly place upon the market an animal which was going to spread disease should be made punishable. The interests of the breeders of pedigree stock ought also to be considered. They were hampered by the regulations of foreign powers, who were keeping a watchful eye upon what we were doing as to abortion. We were the pioneers in the export of pedigree stock, but if we remained inactive in this matter there would come a time when foreign countries would say, "We don't want you."

Mr. Nunnerley asked if there was a difference between what was sometimes called accidental or casual abortion and epizootic or contagious abortion.

Professor Wilson: Yes, there is.

Mr. Nunnerley: That is one reason why dairy farmers are so much opposed to the notification of this disease. My experience goes back a long time, and I think I am correct in saying we have something like 2 or 3 per cent. of casual abortion. That would make me rather chary about having to notify those cases.

Mr. Alfred Tanner: Supposing the disease disappears from a farm in three years?

Professor Wilson: The animals acquire immunity.

Mr. Tanner: Would the heifers be immune in that case?

Professor Wilson: No; but we can say by aborting whether they are infected or not.

Mr. Alfred Mansell, taking up the suggestion that the use of a cow that had once aborted should be avoided, asked if it was meant to apply to a pedigree herd.

Professor Wilson: If I had a pedigree herd, and a cow aborted, I should let her go barren.

Mr. Mansell: If you had eight or ten such animals? It is a serious thing.

Professor Wilson: I know, but I should face it. The seeds of abortion may remain, and if you use the cow again your bull may be the means of spreading the disease in the herd. You cannot get away from the fact that these seeds can be latent in the system seven months. The

greater the number of animals saved by the sacrifice of the few, however valuable they may be, the greater the advantage to the whole community—until we find some remedy. I know it is a tall order, but it must be.

Mr. Mansell: A man has fifty very valuable cows and forty may abort, and, as Mr. Tanner says, in three years the disease dies out. Professor Wilson: Not dies out; the cows have acquired a certain immunity.) To do precisely what you recommend would be to entirely do away with some valuable herds.

Professor Wilson: That does not affect the principle upon which we are working.

Mr. Mansell: But with valuable pedigree animals it may mean wiping out the whole herd. I know cases where practically every cow has aborted, but with a little patience the herd has re-established itself.—“Live Stock Journal.”

PUBLICATION RECEIVED.

We have received from the London publishers, Messrs. J. Bale, Sons, and Danielsson, Ltd., a copy of a most valuable and interesting work entitled, “Notes on Soil and Plant Sanitation on Cacao and Rubber Estates,” by Harold Hamel Smith, editor of “Tropical Life.” Important points are raised in the book on the necessity of estate owners, and even of the authorities, treating plant diseases on lines similar to those affecting human beings, thus ensuring greater care being taken to keep the trees and plants free from diseases and pests, or, if attacked, of every effort being taken to eradicate them. Of the two products rubber is perhaps the most fully discussed, and special sections are devoted to *Castilloa*, Ceará, Funtumia and Wild Rubbers generally, in the hope of encouraging readers to investigate still further these varieties. The question of tapping rubber, rubber machinery, and cork insulated factories are exhaustively discussed.

The opinions of the authorities quoted, some twenty or more, most of whom are living on or near the estates, confirm all that the author urges for the greater protection of the crops. Professor Wyndham Dunstan, Director of the Imperial Institute, in the important introduction contributed by him, wisely suggests that, since agriculture as a profession, tropical agriculture must be taught by trained professors at a college situated in the Tropics.

We feel confident that if the suggestions made in the book are carried out, three results of the utmost importance to this country will be achieved, viz.:—(1) Progressive and permanent expansion of the agricultural and commercial industries of our tropical colonies and dependencies. (2) A much more rapid increase in our import and export trades, and through these (3) the more regular utilisation of the surplus labour supply of this country.

Meanwhile, governmental departments about to open up fresh areas, or estate owners about to clear and plant up new lands, will find valuable information in the book, supported by leading authorities, on the advantages of forest and isolation belts, or of stump-pulling, the evils of deforestation, and the serious losses occasioned by soil-erosion, reduced or uncertain rainfalls, &c., and how they can be avoided or partially remedied. On these points, therefore, the book will appeal with equal force to officials, planters, and investors on all sides, whether the crops they are interested in be rubber or cacao, cocoanuts or cotton, maize or sugar-cane, tea, coffee or oil-palms.

General Notes.

FORTHCOMING SHOWS.

We are informed by Mr. Arvier, Hon. Secretary of the Queensland Chamber of Agricultural Societies, that the annual show of the Noosa A.H. and I. Society will be held on 1st and 2nd November. The above society is not as yet included in our list of registered societies.

Answers to Correspondents.

SUNFLOWER SEED.

J. W., Ballandean.

We have published several articles in this Journal on the subject of sunflower cultivation, but have not recommended the planting of large areas until a payable price could be obtained for the seed. At the price mentioned by you as being offered by Messrs. Hartley, we certainly think you might venture on planting, say, an acre, as an experiment, which would not be costly. Sown in spring and summer, the Great Russian Sunflower should yield from 40 to 50 bushels per acre. As a rotation after potatoes, especially where the latter have suffered from the scab, a crop of sunflowers should be advantageous.

We have posted you the April issue of the Journal as requested.

A PROLIFIC WEED.

G. HINTON, Apple Tree Creek.

The specimens of pods, leaves, and flowers forwarded by you have been submitted to Mr. F. M. Bailey, Government Botanist, who states:—"The plant is one of the so-called 'Rattle Pods,' the botanic name being *Crotalaria striata*. It is a very widely spread weed, but I am not certain if it is really indigenous to Queensland. With regard to its value as a nitrogen collector and as a green manure, of course, all green vegetable matter improves the soil if dug in as green manure, and this genus in particular, but it must be dug in before the pods ripen. Being one of the leguminous plants it is a collector of nitrogen."

Mr. Bailey adds that it is supposed by some that the *Crotalarias* contain some poisonous property which would make them injurious to stock grazing on the plants, but this he has not verified.

BROODER AND NURSERY.

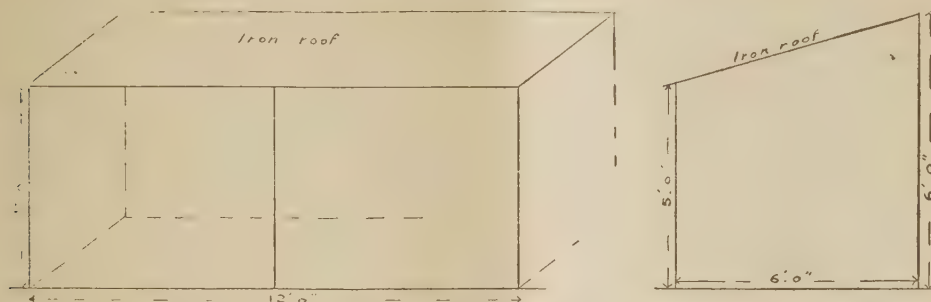
R. F. G. CAREY, Toowoomba—

The best outdoor brooder is the "Cyphers" (Style A). This can be run outside in all weathers. A small run (home-made) can be used as an attachment until the chickens get used to running in and out. A few wind-breaks can be put up with any material on hand, such as brush fences, &c.

HYGIENIC FOWL-HOUSES.

H. W. WATSON, Mount Alford—

The accompanying rough sketch of such a fowl-house as you require has been forwarded to us by Mr. J. Mahon, Principal of the Queensland Agricultural College, and Mr. Hindes, poultry expert at that institution, writes :—The house should face the north-east, have the two ends and back closed in, and wire netting in front. A space of 3 in. for ventilation



should be left between the wall-plate and the roof. The rafters will give this. The back and the two ends may be closed with ruberoid, weatherboards, or any material that may be available, provided there are no cracks left to cause a draught.

K.K.R., Gayndah—

SEX OF CHICKENS.

Your questions have been answered by letter from the Queensland Agricultural College.

The Markets.

PRICES OF FRUIT—TURBOT-STREET MARKETS.

Article.	MAY.	
	Prices.	
Apples (Eating), per case ...	8s. to 10s. 6d.	
Apples (Cooking), per case ...	4s. 6d. to 5s. 6d.	
Apricots, per case ...	...	
Bananas (Cavendish), per dozen ...	3d. to 4½d.	
Bananas (Sugar), per dozen ...	2½d. to 3½d.	
Cherries, per quarter-case ...	...	
Custard Apples, per quarter-case ...	3s. to 4s.	
Grapes, per lb. ...	3d. to 4d.	
Lemons, per case ...	2s. to 7s. 6d.	
Mandarins ...	2s. to 3s. 6d.	
Mangoes, per case ...	...	
Nectarines, per case ...	...	
Oranges, per case ...	1s. 9d. to 3s.	
Papaw Apples, per quarter-case ...	1s. 6d. to 3s.	
Passion Fruit, per case ...	...	
Peaches, per case ...	...	
Pears, per case ...	4s. 6d. to 5s.	
Persimmons, per quarter-case ...	2s. to 3s.	
Plums, per case ...	3s. to 4s.	
Pineapples (Ripley), per dozen ...	2s. 6d. to 3s.	
Pineapples (Rough), per dozen ...	1s. 9d. to 3s.	
Pineapples (Smooth), per dozen ...	4s. to 6s.	
Strawberries, per case ...	6s. to 8s.	
Tomatoes, per quarter-case ...	1s. 3d. to 1s. 6d.	
Watermelons, per dozen ...	...	

SOUTHERN FRUIT MARKET.

Apples (Local), choice, per case ...	6s. to 7s.
Apples (Cooking), choice, per case ...	4s. to 4s. 6d.
Apricots, per gin case ...	...
Bananas (Queensland), per bunch ...	2s. to 7s.
Bananas (Queensland), per case ...	9s. 6d. to 11s.
Bananas (N. Queensland), per bunch ...	...
Bananas (Fiji), G.M., per bunch ...	3s. to 8s.
Bananas (Fiji), G.M., per case ...	11s. to 12s. 6d.
Cocoanuts, per dozen ...	2s. to 2s. 6d.
Custard Apples, per tray ...	5s. to 7s.
Grapes, per half-case ...	3s. to 6s.
Lemons, per gin case ...	5s. 6d. to 6s.
Mandarins, per gin case ...	...
Mandarins (Queensland), Emperors, per gin case ...	6s. to 7s.
Oranges (Queensland), per case ...	7s.
Passion Fruit, per quarter-case ...	5s. to 6s.
Papaw Apples, per case ...	4s. to 5s.
Peaches, per half-case ...	3s. to 5s.
Peanuts, per lb. ...	5½d.
Pears, per gin case ...	3s. 6d. to 5s.
Pears, per bushel-case ...	4s. to 6s.
Persimmons, per half-case ...	3s. 6d. to 4s.
Pineapples (Queensland), common, per case ...	7s.
Pineapples (Queensland), Ripley's, per case ...	9s. to 10s.
Pineapples (Queensland), Queen's, per case ...	10s. to 11s.
Plums, per half-case ...	2s. 6d. to 4s.
Pomegranates, per gin case ...	4s. to 5s.
Quinces, per gin case ...	4s. 6d. to 5s.
Tomatoes, per half-case ...	3s. 6d. to 4s.
Watermelons, per dozen ...	2s. 6d. to 5s.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MAY.

Article.										MAY.	
										Prices.	
Bacon, Pineapple...	...	...	...	...	...	...	...	...	lb.	7½d. to 9d.	
Barley, Malting ...	...	...	...	...	...	...	...	...	bush.	...	
Bran ...	...	...	...	...	...	...	...	...	ton	£6 5s.	
Butter, Factory ...	...	...	...	...	...	...	...	...	lb.	9d.	
Chaff, Mixed ...	...	...	...	...	...	...	...	...	ton	£2 10s. to £4	
Chaff, Oaten (Victorian dumped).	...	...	...	...	...	...	...	...	"	£4 15s. to £5	
Chaff, Lucerne ...	...	...	...	...	...	...	...	...	"	£4 to £4 15s.	
Chaff, Wheaten ...	...	...	...	...	...	...	...	...	"	£2 to £2 5s.	
Cheese ...	...	...	...	...	...	...	...	...	lb.	5¾d. to 6½d.	
Flour ...	...	...	...	...	...	...	...	...	ton	£9	
Hay, Oaten (Victorian) ...	...	...	...	...	...	...	...	...	"	£5 to £5 15s.	
Hay, Lucerne ...	...	...	...	...	...	...	...	...	"	£3	
Honey ...	...	...	...	...	...	...	...	...	lb.	2½d. to 3d.	
Maize ...	...	...	...	...	...	...	...	...	bush.	2s. 6d.	
Millet (Broom) ...	...	...	...	...	...	...	...	...	ton	£20 to £21	
Oats ...	...	...	...	...	...	...	...	...	bush.	3s. 6d. to 3s. 8d.	
Pollard ...	...	...	...	...	...	...	...	...	ton	£6 5s.	
Potatoes ...	...	...	...	...	...	...	...	...	"	£5 to £9	
Potatoes, Sweet ...	...	...	...	...	...	...	...	...	cwt.	2s. 6d.	
Pumpkins ...	...	...	...	...	...	...	...	...	"	2s.	
Pumpkins, Cattle ...	...	...	...	...	...	...	...	...	"	1s. 7d.	
Wheat, Milling ...	...	...	...	...	...	...	...	...	bush.	3s. 7d. to 4s.	
Onions ...	...	...	...	...	...	...	...	...	ton	£3 15s. to £4 2s. 6d.	
Hams ...	...	...	...	...	...	...	...	...	lb.	11d.	
Eggs ...	...	...	...	...	...	...	...	...	doz.	1s. 4d. to 1s. 11d.	
Fowls ...	...	...	...	...	...	...	...	...	pair	3s. to 3s. 9d.	
Geese ...	...	...	...	...	...	...	...	...	"	6s.	
Ducks, English ...	...	...	...	...	...	...	...	...	"	3s. 3d.	
Ducks, Muscovy ...	...	...	...	...	...	...	...	...	"	3s. 6d. to 4s. 6d.	
Turkeys (Hens) ...	...	...	...	...	...	...	...	...	"	5s. 9d.	
Turkeys (Gobblers) ...	...	...	...	...	...	...	...	...	"	10s. 3d. to 10s. 9d.	

TOP PRICES, ENOGGERA YARDS, APRIL, 1911.

Animal.										APRIL.	
										Prices.	
Bullocks ...	...	...	...	...	...	...	...	...	...	£8 12s. 6d. to £9	
Cows ...	...	...	...	...	...	...	...	...	...	£5 7s. 6d. to £6 12s. 6d.	
Merino Wethers ...	...	...	...	...	...	...	...	...	...	18s. 9d.	
Crossbred Wethers...	...	...	...	...	...	...	...	...	...	17s. 6d.	
Merino Ewes ...	...	...	...	...	...	...	...	...	...	14s. 3d.	
Crossbred Ewes ...	...	...	...	...	...	...	...	...	...	18s.	
Lambs ...	...	...	...	...	...	...	...	...	...	15s. 9d.	
Pigs (Baconers) ...	...	...	...	...	...	...	...	...	...	48s.	
Pigs (Porkers) ...	...	...	...	...	...	...	...	...	...	35s.	

PRICES OF FARM PRODUCE FOR APRIL.
LONDON QUOTATIONS.

Article.	APRIL.	
	Price.	
Cotton (Uplands), per lb. ...	...	8·8d.
Cotton (Sea Island), per lb. ...	...	20s. to 22s.
Cotton Seed, per ton ...	...	£8 11s.
Rubber (Pará), per lb. ...	...	6s. 7d. to 6s. 7½d.
Rubber (Ceylon Smohr), per lb. ...	...	6s. to 7s.
Copra (S.S.), per ton ...	...	£20 15s.
Copra (Ceylon), per ton ...	...	£22 15s.
Copra (Malabar), per ton ...	...	£23
Hemp (Manila), per ton ...	...	£19 to £20.
Hemp (Sisal), per ton ...	...	£20 to £20 15s.
Hemp (Indian Sisal), per ton ...	...	£16 to £18
Hemp (Mauritius), per ton ...	...	£24 to £27
Ramie Fibre (China Grass), per ton ...	...	£46 to £50
Soja Bean Oil, per cwt. ...	...	£1 13s.
Soja Beans, per ton ...	...	£7 10s. to £9
Coffee (Costa Rica), per cwt. ...	...	59s. to 73s. 6d.
Coffee (Good Middling to fine bold), per cwt. ...	...	67s. 6d. to 85s.
Coffee (Low Middling), per cwt. ...	...	65s. to 66s.
Coffee (Maragotipe), per cwt. ...	...	96s.
Coffee (Peaberry), per cwt. ...	...	74s. to 92s.

Times of Sunrise and Sunset at Brisbane, 1911.

DATE.	MAY.		JUNE.		JULY.		AUGUST.		PHASES OF THE MOON.
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6·13	5·17	6·30	5·1	6·39	5·3	6·30	5·18	5 May (First Quarter 11 14 p.m.
2	6·14	5·16	6·31	5·0	6·39	5·4	6·30	5·19	13 " ○ Full Moon 4 10 "
3	6·14	5·15	6·31	5·0	6·39	5·4	6·29	5·19	21 " ☾ Last Quarter 7 23 "
4	6·15	5·14	6·32	5·0	6·39	5·4	6·29	5·20	28 " ● New Moon 4 24 "
5	6·15	5·14	6·32	5·0	6·39	5·5	6·28	5·20	
6	6·16	5·13	6·32	5·0	6·39	5·5	6·27	5·21	
7	6·16	5·12	6·33	5·0	6·39	5·6	6·27	5·21	
8	6·17	5·12	6·33	5·0	6·39	5·6	6·26	5·22	4 June (First Quarter 8 4 a.m.
9	6·17	5·11	6·34	5·0	6·39	5·6	6·25	5·22	12 " ○ Full Moon 7 51 "
10	6·18	5·10	6·34	5·0	6·39	5·7	6·24	5·23	20 " ☾ Last Quarter 6 51 "
11	6·18	5·10	6·34	5·0	6·39	5·7	6·24	5·23	26 " ● New Moon 11 20 p.m.
12	6·19	5·9	6·35	5·0	6·39	5·8	6·23	5·24	
13	6·20	5·8	6·35	5·0	6·38	5·8	6·22	5·24	
14	6·20	5·8	6·36	4·59	6·38	5·9	6·21	5·25	
15	6·21	5·7	6·36	4·59	6·38	5·9	6·20	5·25	
16	6·21	5·7	6·36	5·0	6·38	5·10	6·19	5·26	3 July (First Quarter 7 20 p.m.
17	6·22	5·6	6·37	5·0	6·37	5·10	6·18	5·26	11 " ○ Full Moon 10 53 "
18	6·23	5·6	6·37	5·0	6·37	5·11	6·18	5·27	19 " ☾ Last Quarter 3 31 "
19	6·23	5·5	6·37	5·0	6·37	5·12	6·17	5·27	26 " ● New Moon 6 12 a.m.
20	6·24	5·4	6·38	5·0	6·36	5·12	6·16	5·28	
21	6·24	5·4	6·38	5·0	6·36	5·13	6·15	5·28	
22	6·25	5·4	6·38	5·1	6·35	5·13	6·14	5·29	
23	6·25	5·3	6·38	5·1	6·35	5·14	6·13	5·29	
24	6·26	5·3	6·38	5·1	6·35	5·14	6·12	5·30	2 Aug. (First Quarter 9 29 a.m.
25	6·26	5·2	6·39	5·1	6·34	5·15	6·11	5·30	10 " ○ Full Moon 0 55 p.m.
26	6·27	5·2	6·39	5·2	6·33	5·15	6·10	5·31	17 " ☾ Last Quarter 10 11 "
27	6·27	5·2	6·39	5·2	6·33	5·16	6·9	5·31	24 " ● New Moon 2 14 "
28	6·28	5·2	6·39	5·2	6·32	5·16	6·8	5·32	
29	6·28	5·1	6·39	5·3	6·32	5·17	6·7	5·32	
30	6·29	5·1	6·39	5·3	6·31	5·17	6·6	5·32	
31	6·30	5·1	...	...	6·31	5·18	6·5	5·33	

Farm and Garden Notes for July.

FIELD.—The month of July is generally considered the best time to sow lucerne, for the reason that the growth of weeds is then practically checked, and the young lucerne plants will, therefore, not be choked by them, as would be the case if planted later on in the spring. If the ground has been properly prepared by deep ploughing, cross-ploughing, and harrowing, and an occasional shower occurs to assist germination and growth, the lucerne will thrive so well that by the time weeds once more appear it will be well able to hold its own against them. From 10 to 12 lb. of seed will be sufficient for an acre. This is also the time to prepare the land for many field crops, such as potatoes, maize, oats, and barley for green fodder; also, rye, vetches, tobacco, cotton, sugar-cane, field carrots, mangolds, swedes, canaigre, &c. Early potatoes, sugar-cane, and maize may be planted in very early districts, but it is risky to plant potatoes during this month in any districts liable to late frosts or in low-lying ground. Under such conditions, it is far better to wait until well into the following month. The greatest loss in potatoes and sugar-cane has been, on more than one occasion, experienced in September, when heavy frosts occurred in low-lying districts in the Southern portion of the State. During suitable weather, rice may be sown in the North. The coffee crop should now be harvested, and yams and turmeric unearthed.

KITCHEN GARDEN.—Should showery weather be frequent during July, do not attempt to sow seeds on heavy land, as the latter will be liable to clog, and hence be injurious to the young plants as they come up. The soil should not be reworked until fine weather has lasted sufficiently long to make it friable. Never walk over the land during wet weather with a view to sowing. The soil cakes and hardens, and good results cannot then be expected. This want of judgment is the usual cause of hard things being said about the seedsman. In fine weather, get the ground ploughed or dug, and let it lie in the rough till required. If harrowed and pulverised before that time, the growth of weeds will be encouraged, and the soil is deprived of the sweetening influences of the sun, rain, air, and frost. Where the ground has been properly prepared, make full sowings of cabbage, carrot, broad beans, lettuce, parsnips, beans, radishes, leeks, spring onions, beetroot, eschalots, salsify, &c. As westerly winds may be expected, plenty of hoeing and watering will be required to ensure good crops. Pinch the tops of broad beans which are in flower, and stake up peas which require support. Plant out rhubarb, asparagus, and artichokes. In warm districts, it will be quite safe to sow cucumbers, marrows, squashes, and melons during the last week of the month. In colder localities, it is better to wait till the middle or end of August. Get the ground ready for sowing French beans and other spring crops.

FLOWER GARDEN.—Winter work ought to be in an advanced state. The roses will now want looking after. They should already have been pruned, and now any shoots which have a tendency to grow in wrong directions should be rubbed off. Overhaul the ferneries, and top-dress with a mixture of sandy loam and leaf mould, staking up some plants and thinning out others. Treat all class of plants in the same manner as the roses

where undesirable shoots appear. All such work as trimming lawns, digging beds, pruning, and planting should now be got well in hand. Plant out antirrhinums, pansies, hollyhocks, verbenas, petunias, &c., which were lately sown. Sow zinnias, amaranthus, balsam, chrysanthemum tricolour, marigold, cosmos, coxcombs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberose, amaryllis, paneratium, ismene, crinums, belladonna, lily, and other bulbs. Put away dahlia roots in some warm, moist spot, where they will start gently and be ready for planting out in August and September.

Orchard Notes for July.

THE SOUTHERN COAST DISTRICT.

The notes for the month of June apply to July as well. The first crop of strawberries will be ripening during the month, though extra early fruit is often obtained in June, and sometimes as early as May, under especially favourable conditions. Look out for leaf-blight, and spray for same with Bordeaux mixture, also watch for the first signs of the grey mould that attacks the fruit, and spray with the sulphide of soda wash. The larvæ of the cockchafer, that eats the roots of strawberries, should be looked for, and destroyed whenever found. Pruning of citrus and other fruit trees may be continued; also, the spraying with lime and sulphur. Where the ringing borer, that either attacks the main trunk or the branches at or near where they form the head of the tree, is present, the main stems and trunks should either be painted or sprayed with the lime and sulphur wash during the month, as the mature beetles that lay the eggs that eventually turn to the borers sometimes make their appearance during the month, and unless the trees are protected by the wash they lay their eggs, which hatch out in due course and do a lot of damage. Keep the orchard clean, so that when the spring growth takes place the trees may be in good condition. There is usually a heavy winter crop of pineapples ripening during this and the following months, particularly of smooth leaves. See that any conspicuous fruits are protected by a wisp of grass, as they are injured not only by frost but by cold westerly winds.

TROPICAL COAST DISTRICTS.

See the instructions given for the month of June. Keep the orchards clean and well worked. Prune and spray where necessary.

SOUTHERN AND CENTRAL TABLELANDS.

Where pruning of deciduous trees has not been completed, do so this month. It is not advisable to leave this work too late in the season, as the earlier the pruning is done after the sap is down the better the buds develop—both fruit buds and wood buds; thus securing a good blossoming and a good growth of wood the following spring.

Planting can be continued during the month; if possible, it should be finished this month, for though trees can be set out during August, if a dry spell comes they will suffer, when the earlier planted trees, which have had a longer time to become established, will do all right—provided, of course, that the land has been properly prepared prior to planting, and that it is kept in good order by systematic cultivation subsequent to planting.

Do not neglect to cut back hard when planting, as the failure to do so will result in a weakly growth.

As soon as the pruning is completed, the orchards should get their winter spraying with the sulphur limewash, and either with or without salt as may be wished. See that this spraying is thoroughly carried out, and that every part of the tree is reached, as it is the main treatment during the year for San José and other scale insects, as well as being the best time to spray for all kinds of canker, bark-rot, moss, lichens, &c.

Where the orchard has not been ploughed, get this done as soon as the pruning and spraying are through, so as to have the land in good order for the spring cultivations. See that the work is well done, and remember that the best way to provide against dry spells is to keep moisture in the soil once you have got it there, and this can only be done by thorough and deep working of the soil.

When obtaining trees for planting, see that they are on good roots, and that they are free from all pests, as it is easier to prevent the introduction of pests of all sorts than to eradicate them once they have become established. Only select those varieties that are of proved merit in your district; do not plant every kind of tree that you see listed in a nurseryman's catalogue, as many of them are unsuited to our climate. The pruning of grape vines may be carried out in all parts of the tablelands other than the Stanthorpe district, where it is advisable to leave this work as long as possible, owing to the danger of spring frosts.

Where grape vines have been well started and properly pruned from year to year, this work is simple; but where the vines have become covered with long straggling spurs, and are generally very unsightly, the best plan is to cut them hard back, so as to cause them to throw out good strong shoots near the main stem. These shoots can be laid down in the place of the old wood in following seasons, and the whole bearing portion of the vine will be thus renewed.

Where vineyards have been pruned, the prunings should be gathered and burnt, and the land should receive a good ploughing.



**LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL
SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.**

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Baxter ...	2 Feb.	
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association ...	W. Jas. Sullivan ...		
Atherton ...	Atherton Agricultural, Pastoral, and Industrial Association	H. McKnight ...		
Atherton ...	Atherton and North Johnstone River District Farmers' Association	David Steel Imrie		
Atherton ...	Upper Barron and Malanda Farmers' Progress Association	A. G. Jones ...		
Ayr ...	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr ...	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Geo. S. Mackersie	18 and 19 May	
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	M. Selwyn Smith	15 Sept.	
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Gerald D. Savage	15 Sept.	
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Beenleigh ...	The Logan and Albert Canegrowers and Farmers' Association	Wm. Thorsborne ...		
Belli Creek, <i>via</i> Eumundi	Belli Creek Farmers' Progress Association	A. W. Richardson		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	21 and 22 July	6 and 7 July
Biggenden ...	Coalstown Lakes Farmers' Association	H. Radel ...		
Blackall ...	Barcoo Pastoral Society ...	...		
Blackbutt ...	Farmers' Progress Association ...	John Dreghorn ...		
Blenheim, <i>via</i> Laidley	Blenheim and District Farmers' Progress Association	W. A. Zerner ...		
Boonah ...	Fassifern Agricultural and Pastoral Association	H. R. Beverley ...	15 and 16 June	23 and 24 May
Booyal ...	Booyal Farmers' Progress Association	N. Rosenlund ...		
Bowen ...	Pastoral, Agricultural, and Mining Association	A. W. Kirke ...		
Bowen ...	Proserpine Farmers and Settlers' Association	J. Cooper ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowen ...	Bowen Farmers and Fruitgrowers' Association	H. C. Smethurst ...		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...		
Brisbane ...	Queensland Acclimatisation Society	Nicol Robinson ...		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, 11, 12, and 13 Aug.	7 to 12 Aug.
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Beekeepers' Association	George Butler ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Chamber of Agricultural Societies	C. A. Arvier ...		
Brisbane ...	Queensland Fruitgrowers' Industrial Trading Society	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ...		
Brisbane ...	Jersey Cattle Society of Queensland	Alfred Gorrie ...		
Brookfield ...	The Brookfield and Pullen Vale Farmers, Dairymen, and Fruitgrowers' Association	J. Hays ...	20 July	
Brooyar, <i>via</i> Gympie	Brooyar Farmers' Progress Association	E. J. Pike ...		
Buderim ...	Buderim Mountain Coffee and Fruit-growers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Association ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Council of Agriculture ...	H. J. Page ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	H. J. Page ...	22, 23, and 24 Sept.	
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	M. W. Walker ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Bundaberg (Maudsleigh)	Burnett Heads Canegrowers and Farmers' Association	R. O. Strathdee ...		
Byrnestown...	Byrnestown Farmers and Dairy-men's Association	Geo. H. Bomford ...		
Burpengary...	Burpengary Farmers' Association ..	F. W. Uhlmann ...		
Caboolture ...	Caboolture Progress and Farmers' Association	F. W. Uhlmann ...		
Cairns ...	Aloomba Farmers' Association ...	Hugh A. Niven ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	A. H. Clarke ...	15 and 16 Sept.	
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cairns ...	Hambledon Planters' Association ...	A. W. Hawkins ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Cawdor ...	Highfields and Cawdor Farmers' Association	H. Franken ...		
Cedar Pocket, <i>vid</i> Gympie	Cedar Pocket Farmers' Progress Association	J. H. Jamieson ...		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell ...	...	29 and 30 May
Charters Towers	Charters Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	28 and 29 June	
Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Charters Towers	The Towers Horticultural Society ...	Chas. E. Parkinson	...	...
Childers ...	Isis Agricultural Association ...	H. Epps ...		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	R. S. Rankin ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps ...		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	John R. Wrench ...	26 and 27 May	
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Chinchilla ...	Chinchilla Agricultural and Pastoral Association	F. E. Dare ...	6 April	
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley ...		
Clermont ...	Peak Downs Dairymen and Settlers' Association	P. Noonan ...		
Cleveland ...	Cleveland Horticultural Society ...	Miles R. Fox ...		
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. C. Mott ...		
Columboola...	The Columboola Farmers and Settlers' Association	Geo. T. Sutton ...		
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooktown ...	Cook District Pastoral, Agricultural, Mining, and Industrial Association	E. A. S. Olive ...		
Cooran ...	Cooran Progress and Agricultural Association	A. Booth ...		
Cooroy ...	Cooroy Progress and Farmers' Association	A. S. Douglas ...		
Cooyar ...	Yeraman Creek Farmers' Progress Association	M. Harland ...		
Coringa, <i>vid</i> Degilbo	North Dalarnil and Coringa Progress Association	John Leslie ...		
Coulson ...	Coulson Farmers' Progress Association	G. A. Lewald ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 and 27 July	
Croydon ..	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh ...		
Cunnamulla	South Warrego Pastoral Association	J. Winward ...		
Dalby ...	Northern Downs Pastoral and Agricultural Association	Walter R. Hunter	...	9 th and 10 th May
Dallarnil Scrub, <i>vid</i> Degilbo	Dallarnil Farmers and Dairymen's Progress Association	H. J. Piper ...		
Degilbo ...	Degilbo District Farmers and Dairymen's Association	Thos. Brennan ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—continued.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Didcot ...	Didcot Farmers and Settlers' Association	D. B. Hamilton ...		
Dugandan ...	Dugandan Farmers' Progress Association	John M. Court ...		
Dundowran, via Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk ...	Esk Pastoral, Agricultural, and Industrial Association	J. G. Smith ...	...	9 and 10 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Evergreen ...	Evergreen Farmers Progress Association	H. Rickert ...		
Flagstone Ck., via Helidon	Flagstone Creek Farmers' Progress Association	Geo. J. Deller ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	P. G. Woolley ...		
Fordsdale, via Grantham	The Fordsdale and Mount White-stone Farmers' Progress Association	W. M. Ridley ..		
Gayndah ...	Gayndah Pastoral, Industrial, Agricultural, and Horticultural Association	M. C. Stephenson	5 and 6 July	
Gayndah ...	Reid's Creek Farmers' Progress Association	R. E. Wragge ...		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	W. Stevenson ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	Chas. M. Morris ...	2 June	
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. T. W. Brown ...	24 and 25 May	
Gooburrum, Bundaberg	Gooburrum Farmers and Cane-growers' Association	W. J. Tutin ...		
Goombungee	Goombungee Farmers' Association ...	Thos. Smith ...	23 Feb.	
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	27 and 28 April	5 and '6 April
Goondoon ...	Goondoon Farmers' Association ...	H. English... ..		
Gooroolba ...	Gooroolba Farmers' and Settlers' Association	J. Richards ...		
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher...		
Grayson, via Warwick	Grayson Farmers' Progress Association	W. G. Skerman, junr.		
Gunalda ...	Gunalda Farmers' Progress Association	D. J. Caulle ...		
Gympie ...	Agricultural, Mining, and Pastoral Association	F. Vaughan ...	14 and 15 Sept.	
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen ..		
Gympie ...	Gympie Horticultural Society ...	Charles Brasch ...		
Gympie ...	Woondum and Brisbane Road Farmers' Progress Association	J. Mullaly ...		
Gympie ...	Woondum and Mary River Farmers' and Progress Association	F. W. Johns ...		
Gympie ...	Combined Farmers' Association ...	W. Allen ...	3 and 4 June	
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Hatton Vale	Hatton Vale Farmers' Progress Association	W. H. Pimlott ...		
Headington Hill	Queensland Farmers' Association ...	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withcott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	...		
Herbert River	Halifax Planters' Club ...	A. Campbell ...		
Herbert River	Macknade Farmers' Association ...	Edwin S. Waller ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Hollway	28 Mar.	

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Hodgson ...	Hodgson and Dargal Farmers' Association	I. Stevenson ...		
Hughenden ...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	13 and 14 June	
Ideraway ...	Ideraway Farmers' Progress Association	L. Kirkley ...		
Ingham ...	Herbert River Pastoral and Agricultural Association	E. Blackmore ...	23 and 24 Sept.	
Ingham ...	Stone River Farmers' Association ...	W. B. G. Johnson ...		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	W. J. McGill ...		
Ipswich ...	Queensland Pastoral and Agricultural Society	G. W. Allen ...	27 and 29 April	26 and 2 April
Ipswich ...	The Amberley Farmers' Progress Association	Clark T. Seymour ...		
Ithaca ...	Ithaca Progress Association ...	Jas. Greenaway ...		
Kelsey Creek <i>via</i> Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kilcoy ...	Kilcoy Pastoral, Agricultural, and Progress Association	John Walsh ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	M. Bambling ...		
Killarney ...	Killarney Agricultural Society ...	...	9 and 10 Feb.	8 and Feb.
Kingaroy ...	Kingaroy Farmers' Association ...	C. H. Hooper ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	R. W. Whitehead ...	27 and 28 April	19 and 2 April
Kooroongarra	Kooroongarra Farmers' Progress Association	A. E. Markey ...	20 and 21 July	
Laidley ...	Lockyer Agricultural and Industrial Society (at Gatton)	W. A. McIlwraith		
Lake Cootharaba	Lake Cootharaba Agricultural Progress Association	Reg. S. Johnston ...	2 and 3 May	
Lakeside ...	Mungore Farmers' Association ...	A. Reedman ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	11 and 12 May	
Lowood ...	The Lowood and Tarampa Pastoral and Agricultural Association	J. E. Midgley ...		
Ma Ma Creek, <i>via</i> Grantham	Ma Ma Creek Farmers' Progress Association	A. McKenzie ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black ...	14 and 15 June	
Mackay ...	Pioneer River Farmers and Graziers' Association	J. P. Moule ...		
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...	24, 25, and 26 May	
Mareeba ...	Mareeba Mining, Pastoral, and Agricultural Association	F. Cruickshank ...		
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.	22, 23, and 24 June	
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	J. H. Jones ...	...	20, 21, and 22 June
Millmerran ...	Herries Farmers and Settlers' Association	A. Hawthorn ...		
Miriam Vale	Miriam Vale Farmers' Association ...	J. Spencer ...		
Mitchell ...	Maranoa Pastoral, Agricultural, and Industrial Association	Neil Hammond ...	...	23 and 2 May
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	Hy. Hopkins ...		
Mooloolah ...	The Mooloolah and Glenview Progress Association	A. H. Paget ...		
Mosman ...	Mosman Farmers' Association ...	R. D. Rex ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mourilyan ...	Mourilyan Canegrowers' Association	A. D. Campbell ...		
Murray's Creek	Murray and Baffle Creek Progress and Farmers' Association	T. J. Gee ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Nambour ...	Dulong and Kureelpa Farmers and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	Obi Obi Farmers and Dairymen's Progressive Association	H. Robinson ...		
Nambour ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	A. H. Bushnell ...	20 and 21 July	
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. D. Hamilton ...	20 April	
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. Cecil Colledge		
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
North Pine ...	Moreton Agricultural, Horticultural, and Industrial Association	S. A. French ...	17 and 17 June	
Oakey, <i>via</i> Eumundi	Kenilworth Farmers' Association ...	H. Hansen ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace ...		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	J. E. Stanton ...		
Palmwoods ...	Palmwoods Central Horticultural Progress Association	H. W. Major ...		
Peachester, <i>via</i> Beerwah, N.C. Line	The Peachester Progress Association	W. Vieritz ...		
Pelican ...	The Pelican Farmers and Settlers' Progress Association	H. K. Nevel ...		
Pickanjenie	The Pickanjenie Farmers' Progress Association	J. Bickerstaff ...		
Pie and Eel Creek	Pie and Eel Creek Farmers' Progress Association	David Webster, junr.		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	L. G. Sims ...	26 Jan.	25 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. J. Scott ...		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	H. McMahon ...		
Proserpine ...	Preston Farmers and Settlers' Association	W. B. Morgan ...		
Proserpine ...	Preston Farmers and Canegrowers' Association	R. C. Dagg ...		
Proserpine ...	Cannon Valley and District Farmers' Progress Association	W. A. Compton ...		
Queenton, <i>via</i> Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Roadvale ...	Roadvale Progress Association ...	Henry Clark ...		
Rockhampton	Alton Downs Farmers' Association...	G. T. Crook ...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		
Rockhampton	Mount Etna Farmers and Selectors' Progress Association	G. Smith ...		
Rockhampton	Rockhampton Agricultural Society...	H. Hill ...	9 10, and 11 June	22, 23, and 24 June
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson		16 and 10 May
Roma (Blythedale)	Warooby Farmers' Association ...	Geo. Munt ...		
Roma ...	Euthulla Farmers and Fruitgrowers' Association	J. Bates ...		
Roma ...	The United Maranoa Farmers' Association	R. Frederick, senr.		
Rosedale ...	The Rosedale and Tottenham Agricultural Society	F. Guérin ...		
Rosewood ...	Rosewood Farmers' Club ...	W. G. S. Blackmore	22 and 23 June	
Southport ...	Southport Horticultural Society ...	E. Fass ...		
Springsure ...	Springsure Pastoral and Agricultural Society	W. Fisher ...	19 and 20 May	

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Stanthorpe ...	Border Agricultural, Horticultural, and Pastoral and Mining Society	Geo. Simcocks ...	10 and 11 Feb.	2 and Feb.
St. George ...	Balonne Pastoral and Agricultural Society	T. M. Cummings ...		
Sydney ...	Royal Agricultural Society of New South Wales	...	22 to 30 March	
Tabragalba ...	Tabragalba and Canungra Farmers' Progress Association	A R. Ludwig ...		
Takura (Pialba line)	Takura Farmers' Progress Association	W. J. Sorensen ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Thornton ...	Thornton Farmers' Progress Association	Geo. W. Dreyesen		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Tingoora ...	Tingoora Farmers' Progress Association	T. E. Campbell ...		
Tolga ...	Rocky Creek District Farmers' Association	N. A. R. Pollock ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	19, 20, 21, 22 April	2, 3, and May
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	24 and 25 May	
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Wallumbilla	Wallumbilla Farmers' Association ...	A. Budd ...		
Warren ...	Woodend Farmers' Club ...	W. Lehfeldt ...		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15, 16, and 17 Feb.	15, 15, and 16 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	P. Hardgrave ...	23 July	
West Haldon, <i>via</i> Greenmount	West Haldon Farmers' Progress Association	C. J. Byron ...		
Wondai ...	Mondure Farmers' Progress Association	G. W. Roseby ...		
Wondai ...	Wondai Farmers' Progress Association	W. W. Finnimore		
Woolloom-gabba	Queensland Dairy Herdbook Society	Alfred Gorrie ...		
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Wooroolin ...	Wooroolin Farmers' Progress Association	A. Deighton ...		
Wooroolin (Memerambi Siding)	Memerambi Farmers' Progress Association	J. E. Reid ...		
Yandina ...	Maroochy River Farmers' Union and Progress Association	W. R. Brayden ...		
Yerra (Mungar Junction)	Yerra District Farmers' Progress Association	H. W. Williamson		
Yingerbay ...	Yingerbay Farmers' Association ...	R. Frederich ...		
Zillmere ...	Zillmere Agricultural, Horticultural, and Industrial Society	Thos. Crompton ...	17 Sept.	

Societies and associations desirous of being registered and placed on the above list must make application to that effect, and forward to the Under Secretary for Agriculture and Stock the following particulars:—

Number of members who have paid their subscriptions for 1910.

Number of meetings held by the Society during 1910.

Date of the last meeting.

Name of the Secretary for 1911.

Departmental Announcements.

The EDITOR will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the EDITOR, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of SIXPENCE to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at ONE SHILLING each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, J. Mitchell; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, John Liverseed; Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Roma State Farm, manager, R. Soutter; State Farm, "Warren," Stanwell, manager, Thos. Jones; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

The Department has now prepared a booklet on "Flower Gardening for Amateurs," which may be obtained on application to the Under Secretary for Agriculture and Stock. Price, TWO SHILLINGS.

NOTICE OF SHOW DATES.

We wish to draw the attention of Secretaries of Agricultural and Pastoral Societies and Associations to the importance of promptly notifying the Editor of any change in the dates on which shows are to be held.

THE BOUNTIES ACT.

The Department of Agriculture and Stock have received from the Comptroller-General of Customs, Melbourne, a number of copies of "Memorandum for Information of Growers" and "Form of Notice of Intention to Claim Bounty" under the Commonwealth Bounties Act. Should any grower desire a copy of either the above, same will be supplied upon application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

"QUEENSLAND AGRICULTURAL JOURNAL."—GENERAL INDEX, VOLS. I. TO XXIV.

The GENERAL INDEX may be obtained on application to the Under Secretary, Department of Agriculture and Stock. Price: ONE SHILLING AND SIXPENCE.

DIRECTIONS FOR FORWARDING SPECIMENS

(ENTOMOLOGY AND PLANT PATHOLOGY).

NOTE.—Experience has shown that the opportunity of seeking the advice of the Entomologist and Vegetable Pathologist has not been embraced, owing to the lack of information regarding proper procedure for the transmission of specimens; also, that satisfactory information has not been accorded when, although this has not been the case, either no specimens at all have accompanied the application or such only as on arrival have been found to be—by reason of their condition—unsuitable for examination. Under these circumstances, the following Directions are issued for public information:—

INSECTS.

If it be desired that the insects be received whilst still alive, some of the food-plant—not superficially wet, however—should be included in the box containing them, and, also, a little dry crushed paper, as an absorbent of moisture. Insects frequenting soil—or wood—should be sent in these matter, and generally insects injurious to articles derived from plants or animals or to manufactured products should be forwarded in samples of these articles or substances. Holes should not be made in the boxes used, unless quite exceptionally—when they should be limited to two or three, and be quite small.

Plants or portions of plants, including fruit, tubers, &c., that may illustrate insect injury, should be sent as directed for plants subject to disease proper. (See “Plant Diseases.”) Such specimens may be of great interest.

Generally speaking, insects should be forwarded in a dead condition, the killing having been effected by the “cyanide bottle,” tobacco fumes or anæsthetic, for fragile examples—moths, flies, &c., for instance; and by these agencies or by immersion in spirits of wine, formalin, hot water, &c., for hard-bodied ones—beetles, plant-bugs, grasshoppers, &c.—and for insects generally not suffering damage through being made wet, such as caterpillars or grubs. Dead examples of the latter kinds should be sent in spirits of wine diluted with water 1 part in 4, formalin diluted with water 1 part in 20, or in gin or other alcoholic beverage; the phial containing them, completely filled with its contents, being packed in a “mailing tube,” perforated wooden block, section of bamboo stem, or strong box.

Hard-bodied insects that have been immersed in spirits or formalin may be removed from these fluids, and sent, whilst still moist, packed amidst sawdust to which a few drops of carbolic acid or oil of turpentine have been added; or, if killed in other ways, be allowed to become perfectly dry and packed then in this medicated substance, great care being exercised in handling in the latter case. Small insects, when dry, should be packed in shredded tissue paper scattered amongst them or between layers of this; cotton wool should never be used in contact with them.

Butterflies and moths should be sent pinned (in impaling them they should be placed on their sides and the pin thrust through their thorax or mid-body) to cork, cork linoleum, or pith fastened to the inside of the box. The finer lace pins are suitable for this purpose. Or butterflies—and moths in some instances—may be enclosed in papers folded into triangular-shaped packets, of sizes to match the respective insects, these afterwards being packed into a box with crushed paper, to prevent movement, and powdered “moth ball” (Naphthalene) to repel ants.

In some instances (Scale Insects, &c.) it will be necessary to send food-plant (bark, stem, or leaf) and insect in association, each such specimen being simply wrapped in soft paper.

PLANT DISEASES.

PLANTS AND PORTIONS THEREOF.

These, if practicable, should be forwarded carefully packed so as to arrive in a condition approaching that exhibited when they were first procured. They should not be externally wet, however, or even damp—much less should their surfaces be moistened. If roots accompany the specimens, care should be taken

lest earth-particles therefrom soil the leaves or flowers; this may be secured by enclosing them in a paper or linen bag. Should circumstances not admit of their transmission in a fresh state, the specimens should be carefully dried between paper and under slight pressure only (not sufficient to quite flatten them out). They should be handled as little as possible either in gathering them, submitting them to this process, or in finally packing them. When being transmitted, they should be packed in soft paper between card or mill board. Any solid substance that will not quickly dry—roots or succulent stems, for example—and is liable to prompt decay, should be immersed in formalin 1 part in 20 water or in alcohol 1 part in 4 water prior to sending, and forwarded in this; or, after immersion for any period not less than 48 hours in one of these fluids, be taken out, wrapped in linen that has been moistened therewith, and enclosed in a tin box under conditions that will admit of moisture being conserved. In other cases—wood, fruit, tubers, &c.—the specimens may be forwarded securely packed in any ordinary manner.

GENERAL.

Specimens should be sent in fair number or amount, so as to afford the investigator full facilities for arriving at certain conclusions.

To identify insects and specimens generally with remarks submitted in writing relating to them, it is necessary that one example of each description in the packet, when this contains objects of more than one kind, be marked by having attached to it or otherwise associated with it a small label bearing a distinguishing number written in pencil. In the case of living specimens this should accompany each receptacle or packet devoted to the individuals of one kind.

When the names or other such facts of interest are sought, especially as aids in arranging collections of insects, &c., numbered duplicates should be sent, to be retained for reference or other purposes; it being understood that no return of specimens sent can be made generally, except by special arrangement.

POSTAL.

When specimens or the vessels containing them are liable to injury, either by concussion or pressure, whilst being transmitted, the package in which they are contained should be strong. Whilst fastened securely, this should not be done in such a way as to prevent inspection of its contents without its being broken. The address and stamp should be attached to a ticket distinct from the outside wrapper of the package, although this should bear the address repeated as well as the name of the sender. It should also be endorsed with a general statement of contents—*e.g.*, "Insects Only."

The charges for Packets by ordinary post are as follows:—1d. for 2 oz. or less, and 1d. for every additional 2 oz. or portion thereof. For those by Parcel Post—6d. for 1 lb. or less, and 3d. for every additional pound or portion thereof.

The address should be an official one, *e.g.*—

The Entomologist—Department of Agriculture and Stock, Brisbane.

And in every case a letter of advice should accompany each consignment.

Under special circumstances, the objects and materials necessary for the collection, preservation, and transmission of specimens may be provided.

DISEASES OF ANIMALS.—EXAMINATION OF SPECIMENS.

In accordance with an Order recently issued by the Minister for Agriculture, any persons deriving their principal means of livelihood from rural pursuits may have specimens, &c., examined by the Bacteriological Department free of charge. The Government Veterinary Surgeon, Mr. A. H. Cory, will at any time make examinations and report upon pathological specimens, &c., in connection with diseases of animals. When forwarding material, full particulars of the case should be given. The specimens should where possible, be wrapped in a cloth saturated with disinfectant before placing in the receptacle, securely packed, and forwarded with the history thereof, carriage prepaid, as quickly as possible to the Department of Agriculture and Stock, Brisbane.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

—:O:—

Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sending an order.

BLACKLEG VACCINE.

DOUBLE VACCINE (powder form) for the PREVENTION of BLACKLEG is now prepared by the Department of Agriculture and Stock, and may be obtained in Tubes containing not less than Ten Doses, at a cost of 3s. per Ten Double Doses.

Full Instructions for Use are sent with the Vaccine.

Applications for same must be accompanied by Remittance, and addressed to:—

THE GOVERNMENT BACTERIOLOGIST,

STOCK EXPERIMENT STATION,

YEERONGPILLY,

NEAR BRISBANE.

“THE QUEENSLAND FLORA”

BY F. MANSON BAILEY, F.L.S.,

Colonial Botanist of Queensland.

WITH PLATES ILLUSTRATING SOME RARE SPECIES.

IN SIX PARTS, OF BETWEEN 300 AND 400 PAGES EACH, ROYAL OCTAVO.

Price, £1 10s. for Complete Work.

Obtainable at the DEPARTMENT of AGRICULTURE and STOCK.

LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Paxter ...	2 Feb.	1 Feb.
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association ...	W. Jas. Sullivan ...		
Atherton ...	Atherton Agricultural, Pastoral, and Industrial Association	H. McKnight ...		
Atherton ...	Atherton and North Johnstone River District Farmers' Association	David Steel Imrie		
Atherton ...	Upper Barron and Malanda Farmers' Progress Association	A. G. Jones ...		
Ayr ...	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr ...	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Geo. S. Mackersie	18 and 19 May	
Feardisart ...	Logan and Albert Pastoral and Agricultural Society	M. Selwyn Smith	15 Sept.	
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Gerald D. Savage	15 Sept.	
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Beenleigh ...	The Logan and Albert Canegrowers and Farmers' Association	Wm. Thorsborne ...		
Belli Creek, <i>via</i> Eumundi	Belli Creek Farmers' Progress Association	A. W. Richardson		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	21 and 22 July	6 and 7 July
Biggenden ...	Coalstown Lakes Farmers' Association	H. Radel ...		
Blackall ...	Barcoo Pastoral Society ...	...		
Blackbutt ...	Farmers' Progress Association ...	John Dregghorn ...		
Blenheim, <i>via</i> Laidley	Blenheim and District Farmers' Progress Association	W. A. Zerner ...		
Boonah ...	Fassifern Agricultural and Pastoral Association	H. R. Beverley ...	15 and 16 June	23 and 2 May
Booyal ...	Booyal Farmers' Progress Association	N. Rosenlund ...		
Bowen ...	Pastoral, Agricultural, and Mining Association	A. W. Kirke ...		
Bowen ...	Proserpine Farmers and Settlers' Association	J. Cooper ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowen ...	Bowen Farmers and Fruitgrowers' Association	H. C. Smethurst ...		
Bristane ...	Horticultural Society of Queensland	F. W. Woodruffe ...		
Bristane ...	Queensland Acclimatisation Society	Nicol Robinson ...		
Bristane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, 11, 12, and 13 Aug.	7 to 12 Aug.
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Beekeepers' Association	George Butler ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Chamber of Agricultural Societies	C. A. Arvier ...		
Brisbane ...	Queensland Fruitgrowers' Industrial Trading Society	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ...		
Brisbane ...	Jersey Cattle Society of Queensland	Alfred Gorrie ...		
Brookfield ...	The Brookfield and Pullen Vale Farmers, Dairymen, and Fruitgrowers' Association	J. Hays ...	20 July	
Brooyar, <i>via</i> Gympie	Brooyar Farmers' Progress Association	E. J. Pike ...		
Buderim ...	Buderim Mountain Coffee and Fruitgrowers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Association ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Council of Agriculture ...	H. J. Page ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	H. J. Page ...	22, 23, and 24 Sept.	7 and 8 Sept.
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	M. W. Walker ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Bundaberg (Maudsleigh)	Burnett Heads Canegrowers and Farmers' Association	R. O. Strathdee ...		
Byrnestown...	Byrnestown Farmers and Dairy-men's Association	Geo. H. Bomford ...		
Burpengary...	Burpengary Farmers' Association ...	F. W. Uhlmann ...		
Caboolture ...	Caboolture Progress and Farmers' Association	F. W. Uhlmann ...		
Cairns ...	Aloomba Farmers' Association ...	Hugh A. Niven ...		
Cairns ..	Cairns Agricultural, Pastoral, and Mining Association	A. H. Clarke ...	15 and 16 Sept.	
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cairns ...	Hambleton Planters' Association ...	A. W. Hawkins ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Cawdor ...	Highfields and Cawdor Farmers' Association	H. Franken ...		
Cedar Pocket, via Gympie	Cedar Pocket Farmers' Progress Association	J. H. Jamieson ...		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell ...	...	29 and 30 May
Charters Towers	Charters Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	28 and 29 June	
Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Charters Towers	The Towers Horticultural Society ...	Chas. E. Parkinson	...	...
Childers ...	Isis Agricultural Association ...	H. Epps ...		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	R. S. Rankin ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps ...		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	John R. Wrench ...	26 and 27 May	
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Chinchilla ...	Chinchilla Agricultural and Pastoral Association	F. E. Dare ...	6 April	
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley ...		
Clermont ...	Peak Downs Dairymen and Settlers' Association	P. Noonan ...		
Cleveland ...	Cleveland Horticultural Society ...	Miles R. Fox ...		
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. C. Mott ...		
Columboola...	The Columboola Farmers and Settlers' Association	Geo. T. Sutton ...		
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooktown ...	Cook District Pastoral, Agricultural, Mining, and Industrial Association	E. A. S. Olive ...		
Cooran ...	Cooran Progress and Agricultural Association	A. Booth ...		
Cooroy ...	Cooroy Progress and Farmers' Association	A. S. Douglas ...		
Cooyar ...	Yeraman Creek Farmers' Progress Association	M. Harland ...		
Coringa, via Degilbo	North Dalarnil and Coringa Progress Association	John Leslie ...		
Coulson ...	Coulson Farmers' Progress Association	G. A. Lewald ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 and 27 July	
Croydon ..	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh ...		
Cunnamulla	South Warrego Pastoral Association	J. Winward ...		
Dalby ...	Northern Downs Pastoral and Agricultural Association	Walter R. Hunter	...	9 and 10 May
Dallarnil Scrub, via Degilbo	Dallarnil Farmers and Dairymen's Progress Association	H. J. Piper ...		
Degilbo ...	Degilbo District Farmers and Dairymen's Association	Thos. Brennan ...		
Degilbo ...	Emu Creek Farmers and Dairymen's Progress Association	Percy Harrison ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Didcot ...	Didcot Farmers and Settlers' Association	D. B. Hamilton ...		
Dugandan ...	Dugandan Farmers' Progress Association	John M. Court ...		
Dundowran, via Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk ...	Esk Pastoral, Agricultural, and Industrial Association	J. G. Smith ...	...	9 and 10 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Evergreen ...	Evergreen Farmers Progress Association	H. Rickert ...		
Flagstone Ck., via Helidon	Flagstone Creek Farmers' Progress Association	Geo. J. Deller ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	P. G. Woolley ...		
Fordsdale, via Grantham	The Fordsdale and Mount White-stone Farmers' Progress Association	W. M. Ridley ..		
Gayndah ...	Gayndah Pastoral, Industrial, Agricultural, and Horticultural Association	M. C. Stephenson	5 and 6 July	
Gayndah ...	Reid's Creek Farmers' Progress Association	R. E. Wragge ...		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	W. Stevenson ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	Chas. M. Morris ...	2 June	
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. T. W. Brown ...	24 and 25 May	
Gooburrum, Bundaberg	Gooburrum Farmers and Cane-growers' Association	W. J. Tutin ...		
Goombungee	Goombungee Farmers' Association...	Thos. Smith ...	23 Feb.	
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	27 and 28 April	5 and 6 April
Goondoon ...	Goondoon Farmers' Association ...	H. English... ..		
Gooroolba ...	Gooroolba Farmers' and Settlers' Association	J. Richards ...		
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher...		
Grayson, via Warwick	Grayson Farmers' Progress Association	W. G. Skerman, junr.		
Gunalda ...	Gunalda Farmers' Progress Association	D. J. Caulle ...		
Gympie ...	Agricultural, Mining, and Pastoral Association	F. Vaughan ...	14 and 15 Sept.	
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen ..		
Gympie ...	Gympie Horticultural Society	Charles Brasch ...		
Gympie ...	Woondum and Brisbane Road Farmers' Progress Association	J. Mullaly... ..		
Gympie ...	Woondum and Mary River Farmers' and Progress Association	F. W. Johns ...		
Gympie ...	Combined Farmers' Association ...	W. Allen ...	3 and 4 June	
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Hatton Vale	Hatton Vale Farmers' Progress Association	W. H. Pimlott ...		
Headington Hill	Queensland Farmers' Association ...	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withcott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	...		
Herbert River	Halifax Planters' Club ...	A. Campbell ..		
Herbert River	Macknade Farmers' Association ...	Edwin S. Wal'er ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Hollway	28 Mar.	

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Hodgson ...	Hodgson and Dargal Farmers' Association	L. Stevenson ...		
Hughenden ...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	13 and 14 June	
Ideraway ...	Ideraway Farmers' Progress Association	L. Kirkley ...		
Ingham ...	Herbert River Pastoral and Agricultural Association	E. Blackmore ...	23 and 24 Sept.	
Ingham ...	Stone River Farmers' Association ...	W. B. G. Johnson ...		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	W. J. McGill ...		
Ipswich ...	Queensland Pastoral and Agricultural Society	G. W. Allen ...	27 and 29 April	26 and 28 April
Ipswich ...	The Amberley Farmers' Progress Association	Clark T. Seymour ...		
Ithaca ...	Ithaca Progress Association ...	Jas. Greenaway ...		
Kelsey Creek <i>viâ</i> Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kilcoy ...	Kilcoy Pastoral, Agricultural, and Progress Association	John Walsh ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	M. Bambling ...		
Killarney ...	Killarney Agricultural Society ...	...	9 and 10 Feb.	8 and 9 Feb.
Kingaroy ...	Kingaroy Farmers' Association ...	C. H. Hooper ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	R. W. Whitehead ...	27 and 28 April	19 and 20 April
Kooroongarra	Kooroongarra Farmers' Progress Association	A. E. Markey ...	20 and 21 July	
Laidley ...	Lockyer Agricultural and Industrial Society (at Gatton)	W. A. McIlwraith		
Lake Cootharaba	Lake Cootharaba Agricultural Progress Association	Reg. S. Johnston ...	2 and 3 May	
Lakeside ...	Mungore Farmers' Association ...	A. Reedman ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	11 and 12 May	10 and 11 May
Lowood ...	The Lowood and Tarampa Pastoral and Agricultural Association	J. E. Midgley ...		17 and 18 May
Ma Ma Creek, <i>viâ</i> Grantham	Ma Ma Creek Farmers' Progress Association	A. McKenzie ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black ...	14 and 15 June	
Mackay ...	Pioneer River Farmers and Graziers' Association	J. P. Moule ...		
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...	24, 25, and 26 May	
Mareeba ...	Mareeba Mining, Pastoral, and Agricultural Association	F. Cruckshank ...		
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.	22, 23, and 24 June	
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	J. H. Jones ...		20, 21, and 22 June
Millmerran ...	Herries Farmers and Settlers' Association	A. Hawthorn ...		
Miriam Vale	Miriam Vale Farmers' Association...	J. Spencer ...		
Mitchell ...	Maranoa Pastoral, Agricultural, and Industrial Association	Neil Hammond ...		23 and 24 May
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	Hy. Hopkins ...		
Mooloolah ..	The Mooloolah and Glenview Progress Association	A. H. Paget ...		
Mosman ...	Mosman Farmers' Association ...	R. D. Rex ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mourilyan ...	Mourilyan Canegrowers' Association	A. D. Campbell ...		
Murray's Creek	Murray and Baffle Creek Progress and Farmers' Association	T. J. Gee ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Nambour ...	Dulong and Kureelipa Farmers and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	Obi Obi Farmers and Dairymen's Progressive Association	H. Robinson ...		
Nambour ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	A. H. Bushnell ...	20 and 21 July	
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. D. Hamilton ...	20 April	
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. Cecil Colledge		
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
North Pine ...	Moreton Agricultural, Horticultural, and Industrial Association	S. A. French ...	17 and 17 June	
Oakey, <i>via</i> Eumundi	Kenilworth Farmers' Association ...	H. Hansen ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace ...		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	J. E. Stanton ...		
Palmwoods ...	Palmwoods Central Horticultural Progress Association	H. W. Major ...		
Peachester, <i>via</i> Beerwah, N.C. Line	The Peachester Progress Association	W. Vieritz ...		
Pelican ...	The Pelican Farmers and Settlers' Progress Association	H. K. Nevel ...		
Pickanjenie	The Pickangennie Farmers' Progress Association	J. Bickerstaff ...		
Pie and Eel Creek	Pie and Eel Creek Farmers' Progress Association	David Webster, junr.		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	L. G. Sims ...	26 Jan.	25 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. J. Scott ...		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	H. McMahon ...		
Proserpine ...	Preston Farmers and Settlers' Association	W. B. Morgan ...		
Proserpine ...	Preston Farmers and Canegrowers' Association	R. C. Dagg ...		
Proserpine ...	Cannon Valley and District Farmers' Progress Association	W. A. Compton ...		
Queenton, <i>via</i> Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Roadvale ...	Roadvale Progress Association ...	Henry Clark ...		
Rockhampton	Alton Downs Farmers' Association...	G. T. Crook ...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		
Rockhampton	Mount Etna Farmers and Selectors' Progress Association	G. Smith ...		
Rockhampton	Rockhampton Agricultural Society...	H. Hill ...	9 10, and 11 June	22, 23, and 24 June
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	...	16 and 10 May
Roma (Blythdale)	Warooby Farmers' Association ...	Geo. Munt... ..		
Roma ...	Euthulla Farmers and Fruitgrowers' Association	J. Bates ...		
Roma ...	The United Maranoa Farmers' Association	R. Frederick, senr.		
Rosedale ...	The Rosedale and Tottenham Agricultural Society	F. Guérin ...		
Rosewood ...	Rosewood Farmers' Club ...	W. G. S. Blackmore	22 and 23 June	
Southport ...	Southport Horticultural Society ...	E. Fass ...		
Springsure ...	Springsure Pastoral and Agricultural Society	W. Fisher ...	19 and 20 May	

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Stanthorpe ...	Border Agricultural, Horticultural, and Pastoral and Mining Society	Geo. Simcocks ...	10 and 11 Feb.	2 and Feb.
St. George ...	Balonne Pastoral and Agricultural Society	T. M. Cummings ...		
Sydney ...	Royal Agricultural Society of New South Wales	...	22 to 30 March	
Tabragalba ...	Tabragalba and Canungra Farmers' Progress Association	A R. Ludwig ...		
Takura (Pialba line)	Takura Farmers' Progress Association	W. J. Sorensen ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Thornton ...	Thornton Farmers' Progress Association	Geo. W. Drevesen		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Tingoora ...	Tingoora Farmers' Progress Association	T. E. Campbell ...		
Tolga ...	Rocky Creek District Farmers' Association	N. A. R. Pollock ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	19, 20, 21, 22 April	2, 3, and 4 May
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	24 and 25 May	
		A. Marshall ...		
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Pickering ...		
Wallumbilla	Wallumbilla Farmers' Association ...	A. Budd ...		
Warren ...	Woodend Farmers' Club ...	W. Lehfeldt ...		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15, 16, and 17 Feb.	15, 15, and 16 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	P. Hardgrave ...	23 July	
West Haldon, <i>via</i> Greenmount	West Haldon Farmers' Progress Association	C. J. Byron ...		
Wondai ...	Mondure Farmers' Progress Association	G. W. Roseby ...		
Wondai ...	Wondai Farmers' Progress Association	W. W. Finnimore		
Woolloom-gabba	Queensland Dairy Herdbook Society	Alfred Gorrie ...		
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Wooroolin ...	Wooroolin Farmers' Progress Association	A. Deighton ...		
Wooroolin (Memerambi Siding)	Memerambi Farmers' Progress Association	J. E. Reid ...		
Yandina ...	Maroochy River Farmers' Union and Progress Association	W. R. Brayden ...		
Yerra (Mungar Junction)	Yerra District Farmers' Progress Association	H. W. Williamson		
Yingerbay ...	Yingerbay Farmers' Association ...	R. Frederich ...		
Zillmere ...	Zillmere Agricultural, Horticultural, and Industrial Society	Thos. Crompton ...	17 Sept.	

Societies and associations desirous of being registered and placed on the above list must make application to that effect, and forward to the Under Secretary for Agriculture and Stock the following particulars:—

Number of members who have paid their subscriptions for 1910.

Number of meetings held by the Society during 1910.

Date of the last meeting.

Name of the Secretary for 1911.

Departmental Announcements.

The EDITOR will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the EDITOR, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of SIXPENCE to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at ONE SHILLING each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, J. Mitchell; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, John Liverseed; Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Roma State Farm, manager, R. Soutter; State Farm, "Warren," Stanwell, manager, Thos. Jones; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the institution. Supplies of hot water and milk can be obtained at the College, if desired.

The Department has now prepared a booklet on "Flower Gardening for Amateurs," which may be obtained on application to the Under Secretary for Agriculture and Stock. Price, TWO SHILLINGS.

NOTICE OF SHOW DATES.

We wish to draw the attention of Secretaries of Agricultural and Pastoral Societies and Associations to the importance of promptly notifying the Editor of any change in the dates on which shows are to be held.

THE BOUNTIES ACT.

The Department of Agriculture and Stock have received from the Comptroller-General of Customs, Melbourne, a number of copies of "Memorandum for Information of Growers" and "Form of Notice of Intention to Claim Bounty" under the Commonwealth Bounties Act. Should any grower desire a copy of either the above, same will be supplied upon application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

"QUEENSLAND AGRICULTURAL JOURNAL."—GENERAL INDEX, VOLS. I. TO XXIV.

The GENERAL INDEX may be obtained on application to the Under Secretary, Department of Agriculture and Stock. Price: ONE SHILLING AND SIXPENCE.

DIRECTIONS FOR FORWARDING SPECIMENS

(ENTOMOLOGY AND PLANT PATHOLOGY).

NOTE.—Experience has shown that the opportunity of seeking the advice of the Entomologist and Vegetable Pathologist has not been embraced, owing to the lack of information regarding proper procedure for the transmission of specimens; also, that satisfactory information has not been accorded when, although this has not been the case, either no specimens at all have accompanied the application or such only as on arrival have been found to be—by reason of their condition—unsuitable for examination. Under these circumstances, the following Directions are issued for public information:—

INSECTS.

If it be desired that the insects be received whilst still alive, some of the food-plant—not superficially wet, however—should be included in the box containing them, and, also, a little dry crushed paper, as an absorbent of moisture. Insects frequenting soil—or wood—should be sent in these matter, and generally insects injurious to articles derived from plants or animals or to manufactured products should be forwarded in samples of these articles or substances. Holes should not be made in the boxes used, unless quite exceptionally—when they should be limited to two or three, and be quite small.

Plants or portions of plants, including fruit, tubers, &c., that may illustrate insect injury, should be sent as directed for plants subject to disease proper. (See “Plant Diseases.”) Such specimens may be of great interest.

Generally speaking, insects should be forwarded in a dead condition, the killing having been effected by the “cyanide bottle,” tobacco fumes or anæsthetic, for fragile examples—moths, flies, &c., for instance; and by these agencies or by immersion in spirits of wine, formalin, hot water, &c., for hard-bodied ones—beetles, plant-bugs, grasshoppers, &c.—and for insects generally not suffering damage through being made wet, such as caterpillars or grubs. Dead examples of the latter kinds should be sent in spirits of wine diluted with water 1 part in 4, formalin diluted with water 1 part in 20, or in gin or other alcoholic beverage; the phial containing them, completely filled with its contents, being packed in a “mailing tube,” perforated wooden block, section of bamboo stem, or strong box.

Hard-bodied insects that have been immersed in spirits or formalin may be removed from these fluids, and sent, whilst still moist, packed amidst sawdust to which a few drops of carbolic acid or oil of turpentine have been added; or, if killed in other ways, be allowed to become perfectly dry and packed then in this medicated substance, great care being exercised in handling in the latter case. Small insects, when dry, should be packed in shredded tissue paper scattered amongst them or between layers of this; cotton wool should never be used in contact with them.

Butterflies and moths should be sent pinned (in impaling them they should be placed on their sides and the pin thrust through their thorax or mid-body) to cork, cork linoleum, or pith fastened to the inside of the box. The finer lace pins are suitable for this purpose. Or butterflies—and moths in some instances—may be enclosed in papers folded into triangular-shaped packets, of sizes to match the respective insects, these afterwards being packed into a box with crushed paper, to prevent movement, and powdered “moth ball” (Naphthalene) to repel ants.

In some instances (Scale Insects, &c.) it will be necessary to send food plant (bark, stem, or leaf) and insect in association, each such specimen being simply wrapped in soft paper.

PLANT DISEASES.

PLANTS AND PORTIONS THEREOF.

These, if practicable, should be forwarded carefully packed so as to arrive in a condition approaching that exhibited when they were first procured. They should not be externally wet, however, or even damp—much less should their surfaces be moistened. If roots accompany the specimens, care should be taken

lest earth-particles therefrom soil the leaves or flowers; this may be secured by enclosing them in a paper or linen bag. Should circumstances not admit of their transmission in a fresh state, the specimens should be carefully dried between paper and under slight pressure only (not sufficient to quite flatten them out). They should be handled as little as possible either in gathering them, submitting them to this process, or in finally packing them. When being transmitted, they should be packed in soft paper between card or mill board. Any solid substance that will not quickly dry—roots or succulent stems, for example—and is liable to prompt decay, should be immersed in formalin 1 part in 20 water or in alcohol 1 part in 4 water prior to sending, and forwarded in this; or, after immersion for any period not less than 48 hours in one of these fluids, be taken out, wrapped in linen that has been moistened therewith, and enclosed in a tin box under conditions that will admit of moisture being conserved. In other cases—wood, fruit, tubers, &c.—the specimens may be forwarded securely packed in any ordinary manner.

GENERAL.

Specimens should be sent in fair number or amount, so as to afford the investigator full facilities for arriving at certain conclusions.

To identify insects and specimens generally with remarks submitted in writing relating to them, it is necessary that one example of each description in the packet, when this contains objects of more than one kind, be marked by having attached to it or otherwise associated with it a small label bearing a distinguishing number written in pencil. In the case of living specimens this should accompany each receptacle or packet devoted to the individuals of one kind.

When the names or other such facts of interest are sought, especially as aids in arranging collections of insects, &c., numbered duplicates should be sent, to be retained for reference or other purposes; it being understood that no return of specimens sent can be made generally, except by special arrangement.

POSTAL.

When specimens or the vessels containing them are liable to injury, either by concussion or pressure, whilst being transmitted, the package in which they are contained should be strong. Whilst fastened securely, this should not be done in such a way as to prevent inspection of its contents without its being broken. The address and stamp should be attached to a ticket distinct from the outside wrapper of the package, although this should bear the address repeated as well as the name of the sender. It should also be endorsed with a general statement of contents—*e.g.*, "Insects Only."

The charges for Packets by ordinary post are as follows:—1d. for 2 oz. or less, and 1d. for every additional 2 oz. or portion thereof. For those by Parcel Post—6d. for 1 lb. or less, and 3d. for every additional pound or portion thereof.

The address should be an official one, *e.g.*—

The Entomologist—Department of Agriculture and Stock, Brisbane.

And in every case a letter of advice should accompany each consignment.

Under special circumstances, the objects and materials necessary for the collection, preservation, and transmission of specimens may be provided.

DISEASES OF ANIMALS.—EXAMINATION OF SPECIMENS.

In accordance with an Order recently issued by the Minister for Agriculture, any persons deriving their principal means of livelihood from rural pursuits may have specimens, &c., examined by the Bacteriological Department free of charge. The Government Veterinary Surgeon, Mr. A. H. Cory, will at any time make examinations and report upon pathological specimens, &c., in connection with diseases of animals. When forwarding material, full particulars of the case should be given. The specimens should where possible, be wrapped in a cloth saturated with disinfectant before placing in the receptacle, securely packed, and forwarded with the history thereof, carriage prepaid, as quickly as possible to the Department of Agriculture and Stock, Brisbane.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

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Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sending an order.

BLACKLEG VACCINE.

DOUBLE VACCINE (powder form) for the PREVENTION of BLACK-LEG is now prepared by the Department of Agriculture and Stock, and may be obtained in Tubes containing not less than Ten Doses, at a cost of 3s. per Ten Double Doses.

Full Instructions for Use are sent with the Vaccine.

Applications for same must be accompanied by Remittance, and addressed to:—

THE GOVERNMENT BACTERIOLOGIST,

STOCK EXPERIMENT STATION,

YEERONGPILLY,

NEAR BRISBANE.

“THE QUEENSLAND FLORA”

By F. MANSON BAILEY, F.L.S.,

Colonial Botanist of Queensland.

WITH PLATES ILLUSTRATING SOME RARE SPECIES.

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**LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL
SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.**

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Baxter ...	2 Feb.	
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association ...	W. Jas. Sullivan ...		
Atherton ...	Atherton Agricultural, Pastoral, and Industrial Association	H. McKnight ...		
Atherton ...	Atherton and North Johnstone River District Farmers' Association	David Steel Imrie		
Atherton ...	Upper Barron and Malanda Farmers' Progress Association	A. G. Jones ...		
Ayr ...	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr ...	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Geo. S. Mackersie	18 and 19 May	
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	M. Selwyn Smith	15 Sept.	
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Gerald D. Savage	15 Sept.	8 Sept.
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Beenleigh ...	The Logan and Albert Canegrowers and Farmers' Association	Wm. Thorsborne ...		
Belli Creek, <i>via</i> Eumundi	Belli Creek Farmers' Progress Association	A. W. Richardson		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	21 and 22 July	6 and 7 July
Biggenden ...	Coalstown Lakes Farmers' Association	H. Radel ...		
Blackall ...	Barcoo Pastoral Society ...	...		
Blackbutt ...	Farmers' Progress Association ...	John Dregghorn ...		
Blenheim, <i>via</i> Laidley	Blenheim and District Farmers' Progress Association	W. A. Zerner ...		
Boonah ...	Fassitern Agricultural and Pastoral Association	H. R. Beverley ...	15 and 16 June	23 and 24 May
Booyal ...	Booyal Farmers' Progress Association	N. Rosenlund ...		
Bowen ...	Pastoral, Agricultural, and Mining Association	A. W. Kirke ...		
Bowen ...	Proserpine Farmers and Settlers' Association	J. Cooper ...		
Bowen(Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowen ...	Bowen Farmers and Fruitgrowers' Association	H. C. Smethurst ...		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...		
Brisbane ...	Queensland Acclimatisation Society	Nicol Robinson ...		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, 11, 12, and 13 Aug.	7 to 12 Aug.
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Beekeepers' Association	George Butler ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Chamber of Agricultural Societies	C. A. Arvier ...		
Brisbane ...	Queensland Fruitgrowers' Industrial Trading Society	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ...		
Brisbane ...	Jersey Cattle Society of Queensland	Alfred Gorrie ...		
Brookfield ...	Brookfield, Pullen Vale, and Moggill Farmers' Association	F. B. Howard ...	20 July	
Brooyar, <i>via</i> Gympie	Brooyar Farmers' Progress Association	E. J. Pike ...		
Buderim ...	Buderim Mountain Coffee and Fruitgrowers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Association ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	S. F. Luke ...	22, 23, and 24 Sept.	7 and 8 Sept.
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	M. W. Walker ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—continued.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Bundaberg (Maudsleigh)	Burnett Heads Canegrowers and Farmers' Association	R. O. Strathdee ...		
Byrnestown...	Byrnestown Farmers and Dairy-men's Association	Geo. H. Bomford ...		
Burpengary...	Burpengary Farmers' Association ...	F. W. Uhlmann ...		
Caboolture ...	Caboolture Progress and Farmers' Association	F. W. Uhlmann ...		
Cairns ...	Aloomba Farmers' Association ...	Hugh A. Niven ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	A. H. Clarke ...	15 and 16 Sept.	
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cairns ...	Hambleton Planters' Association ...	A. W. Hawkins ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Cawdor ...	Highfields and Cawdor Farmers' Association	H. Franken ...		
Cedar Pocket, <i>vid</i> Gympie	Cedar Pocket Farmers' Progress Association	J. H. Jamieson ...		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell ...	...	29 and 30 May
Charters Towers	Charters Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	28 and 29 June	
Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Charters Towers	The Towers Horticultural Society ...	Chas. E. Parkinson	...	
Childers ...	Isis Agricultural Association ...	H. Epps ...		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	R. S. Rankin ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps ...		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	John R. Wrench ...	26 and 27 May	
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Chinchilla ...	Chinchilla Agricultural and Pastoral Association	F. E. Dare ...	6 April	5 April
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley ...		
Clermont ...	Peak Downs Dairymen and Settlers' Association	P. Noonan ...		
Cleveland ...	Cleveland Horticultural Society ...	Miles R. Fox ...		
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. C. Mott ...		
Columboola...	The Columboola Farmers and Settlers' Association	Geo. T. Sutton ...		
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooktown ...	Cook District Pastoral, Agricultural, Mining, and Industrial Association	E. A. S. Olive ...		
Cooran ...	Cooran Progress and Agricultural Association	A. Booth ...		
Cooroy ...	Cooroy Progress and Farmers' Association	A. S. Douglas ...		
Cooyar ...	Yeraman Creek Farmers' Progress Association	M. Harland ...		
Coringa, <i>vid</i> Degilbo	North Dalarnil and Coringa Progress Association	John Leslie ...		
Coulson ...	Coulson Farmers' Progress Association	G. A. Lewald ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 and 27 July	
Croydon ...	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh ...		
Cunnamulla	South Warrego Pastoral Association	J. Winward		
Dalby ...	Northern Downs Pastoral and Agricultural Association	Walter R. Hunter	...	10 and 11 May
Dallarnil Scrub, <i>vid</i> Degilbo	Dallarnil Farmers and Dairymen's Progress Association	H. J. Piper ...		
Degilbo ...	Degilbo District Farmers and Dairymen's Association	Thos. Brennan ...		
Degilbo ...	Emu Creek Farmers and Dairymen's Progress Association	Percy Harrison ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Didcot ...	Didcot Farmers and Settlers' Association	D. B. Hamilton ...		
Dugandan ...	Dugandan Farmers' Progress Association	John M. Court ...		
Dundowran, via Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk ...	Esk Pastoral, Agricultural, and Industrial Association	J. G. Smith ...	...	9 and 10 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Evergreen ...	Evergreen Farmers Progress Association	H. Rickert ...		
Flagstone Ck., via Helidon	Flagstone Creek Farmers' Progress Association	Geo. J. Deller ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	P. G. Woolley ...		
Fordsdale, via Graham	The Fordsdale and Mount White-stone Farmers' Progress Association	W. M. Ridley ..		
Gayndah ...	Gayndah Pastoral, Industrial, Agricultural, and Horticultural Association	M. C. Stephenson	5 and 6 July	
Gayndah ...	Reid's Creek Farmers' Progress Association	R. E. Wragge ...		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	W. Stevenson ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	Chas. M. Morris ...	2 June	
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. F. W. Brown ...	24 and 25 May	
Gooburru, Eundaberg	Gooburru Farmers and Cane-growers' Association	W. J. Tutin		
Goombungee	Goombungee Farmers' Association...	Thos. Smith ...	23 Feb.	
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	27 and 28 April	5 and 6 April
Goondoon ...	Goondoon Farmers' Association ...	H. English...		
Gooroolba ...	Gooroolba Farmers' and Settlers' Association	J. Richards ...		
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher...		
Grayson, via Warwick	Grayson Farmers' Progress Association	W. G. Skerman, junr.		
Gunalda ...	Gunalda Farmers' Progress Association	D. J. Caille ...		
Gympie ...	Agricultural, Mining, and Pastoral Association	F. Vaughan ...	14 and 15 Sept.	13 and 14 Sept.
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen ..		
Gympie ...	Gympie Horticultural Society	Charles Brasch ...		
Gympie ...	Woondum and Brisbane Road Farmers' Progress Association	J. Mullaly...		
Gympie ...	Woondum and Mary River Farmers' and Progress Association	F. W. Johns ...		
Gympie ...	Combined Farmers' Association ...	W. Allen ...	3 and 4 June	
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Hatton Vale	Hatton Vale Farmers' Progress Association	W. H. Pimlott ...		
Headington Hill	Queensland Farmers' Association ...	J. E. Stehn ..		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withcott, Helidon	Thomas Turner ..		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	...		
Herbert River	Halifax Planters' Club ...	A. Campbell ..		
Herbert River	Macknade Farmers' Association ...	Edwin S. Waller ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Hollway	28 Mar.	

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Hodgson ...	Hodgson and Dargal Farmers' Association	I. Stevenson ...		
Hughenden ...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	13 and 14 June	
Ideraway ...	Ideraway Farmers' Progress Association	L. Kirkley ...		
Ingham ...	Herbert River Pastoral and Agricultural Association	E. Blackmore ...	23 and 24 Sept.	
Ingham ...	Stone River Farmers' Association ...	W. B. G. Johnson		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	W. J. McGill ...		
Ipswich ...	Queensland Pastoral and Agricultural Society	G. W. Allen ...	27 and 29 April	26 and 28 April
Ipswich ...	The Amberley Farmers' Progress Association	Clark T. Seymour ...		
Ithaca ...	Ithaca Progress Association ...	Jas. Greenaway ...		
Kelsey Creek and Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kilcoy ...	Kilcoy Pastoral, Agricultural, and Progress Association	John Walsh ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	M. Bambling ...		
Killarney ...	Killarney Agricultural Society ...	...	9 and 10 Feb.	1 and 2 March
Kingaroy ...	Kingaroy Farmers' Association ...	C. H. Hooper ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	R. W. Whitehead	27 and 28 April	19 and 20 April
Kooroongarra	Kooroongarra Farmers' Progress Association	A. E. Markey ...	20 and 21 July	
Laidley ...	Lockyer Agricultural and Industrial Society (at Gatton)	W. A. McIlwraith		
Lake Cootharaba	Lake Cootharaba Agricultural Progress Association	Reg. S. Johnston ...	2 and 3 May	
Lakeside ...	Mungore Farmers' Association ...	A. Reedman ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	11 and 12 May	10 and 11 May
Lowood ...	The Lowood and Tarampa Pastoral and Agricultural Association	J. E. Midgley ...	...	17 and 18 May
Ma Ma Creek, vid Grantham	Ma Ma Creek Farmers' Progress Association	A. McKenzie ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black ...	14 and 15 June	
Mackay ...	Pioneer River Farmers and Graziers' Association	J. P. Moule ...	...	21 and 22 June
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...	24, 25, and 26 May	
Mareeba ...	Mareeba Mining, Pastoral, and Agricultural Association	F. Cruckshank ...		
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.	22, 23, and 24 June	
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	J. H. Jones ...	...	20, 21, and 22 June
Millmerran ...	Hercies Farmers and Settlers' Association	A. Hawthorn ...		
Miriam Vale	Miriam Vale Farmers' Association ...	J. Spencer ...		
Mitchell ...	Maranoa Pastoral, Agricultural, and Industrial Association	Neil Hammond ...	...	23 and 24 May
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	Hy. Hopkins ...		
Mooloolah ...	The Mooloolah and Glenview Progress Association	A. H. Paget ...		
Mosman ...	Mosman Farmers' Association ...	R. D. Rex ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mourilyan ...	Mourilyan Canegrowers' Association	A. D. Campbell ...		
Murray's Creek	Murray and Baffle Creek Progress and Farmers' Association	T. J. Gee ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Nambour ...	Dulong and Kureelpa Farmers and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	Obi Obi Farmers and Dairymen's Progressive Association	H. Robinson ...		
Nambour ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	A. H. Bushnell ...	20 and 21 July	4 and 5 Oct.
Nanango ..	Nanango Agricultural, Pastoral, and Mineral Society	J. D. Hamilton ...	20 April	
Narangba ...	Pine River Agricultural, Horticultural, and Industrial Association	A. D. Stewart ...		
Nerang ..	Southern Queensland and Border Agricultural and Pastoral Association	H. Cecil Colledge		
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
North Pine ...	Moreton Agricultural, Horticultural, and Industrial Association	S. A. French ...	17 and 17 June	
Oakey, <i>vid</i> Eumundi	Kenilworth Farmers' Association ...	H. Hansen ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace ...		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	J. E. Stanton ...		
Palmwoods ...	Palmwoods Central Horticultural Progress Association	H. W. Major ...		
Peachester, <i>vid</i> Beerwah, N.C. Line	The Peachester Progress Association	W. Vieritz ...		
Pelican ...	The Pelican Farmers and Settlers' Progress Association	H. K. Nevel ...		
Pickanjenie	The Pickanjenie Farmers' Progress Association	J. Bickerstaff ...		
Pie and Eel Creek	Pie and Eel Creek Farmers' Progress Association	David Webster, junr.		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	L. G. Sims ...	26 Jan.	25 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. J. Scott ...		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	H. McMahon ...		
Proserpine ...	Preston Farmers and Settlers' Association	W. B. Morgan ...		
Proserpine ...	Preston Farmers and Canegrowers' Association	R. C. Dagg ...		
Proserpine ...	Cannon Valley and District Farmers' Progress Association	W. A. Compton ...		
Queenton, <i>vid</i> Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Roadvale ...	Roadvale Progress Association ...	Henry Clark ...		
Rockhampton	Alton Downs Farmers' Association..	G. T. Crook ...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		
Rockhampton	Mount Etna Farmers and Selectors' Progress Association	G. Smith ...		
Rockhampton	Rockhampton Agricultural Society...	H. Hill ...	9 10, and 11 June	8 to 10 June
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	...	16 and 10 May
Roma (Blythdale)	Warooby Farmers' Association ...	Geo. Munt... ..		
Roma ...	Euthulla Farmers and Fruitgrowers' Association	J. Bates ...		
Roma ...	The United Maranoa Farmers' Association	R. Frederick, senr.		
Rosedale ...	The Rosedale and Tottenham Agricultural Society	F. Guérin ...		
Rosewood ...	Rosewood Farmers' Club	W. G. S. Blackmore	22 and 23 June	
Southport ...	Southport Horticultural Society	E. Fass		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Springsure ...	Springsure Pastoral and Agricultural Society	W. Fisher ...	and 20 May	
Stanthorpe ...	Border Agricultural, Horticultural, and Pastoral and Mining Society	Geo. Simcocks ...	10 and 11 Feb.	2 and Feb.
St. George ...	Balonne Pastoral and Agricultural Society	T. M. Cummings ...		
Sydney ...	Royal Agricultural Society of New South Wales	...	22 to 30 March	
Tabragalba ...	Tabragalba and Canungra Farmers' Progress Association	A. R. Ludwig ...		
Takura (Pialba line)	Takura Farmers' Progress Association	W. J. Sorensen ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Thornton ...	Thornton Farmers' Progress Association	Geo. W. Drevesen		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Tingoorra ...	Tingoorra Farmers' Progress Association	T. E. Campbell ...		
Tolga ...	Rocky Creek District Farmers' Association	N. A. R. Pollock ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	19, 20, 21, 22 April	2, 3, and May
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	24 and 25 May	
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Wallumbilla	Wallumbilla Farmers' Association ...	A. Budd ...		
Warren ...	Woodend Farmers' Club ...	W. Lehfeldt ...		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15, 16, and 17 Feb.	15, 15, and 16 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	P. Hardgrave ...	23 July	
West Haldon, <i>via</i> Greenmount	West Haldon Farmers' Progress Association	C. J. Byron ...		
Wondai ...	Mondure Farmers' Progress Association	G. W. Roseby ...		
Wondai ...	Wondai Farmers' Progress Association	W. W. Finnimore		
Woolloongabba	Queensland Dairy Herdbook Society	Alfred Gorrie ...		
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Wooroolin ...	Wooroolin Farmers' Progress Association	A. Deighton ...		
Wooroolin (Memerambi Siding)	Memerambi Farmers' Progress Association	J. E. Reid ...		
Yandina ...	Maroochy River Farmers' Union and Progress Association	W. R. Brayden ...		
Yerra (Mungar Junction)	Yerra District Farmers' Progress Association	H. W. Williamson		
Yingerbay ...	Yingerbay Farmers' Association ...	R. Frederich ...		
Zillmere ...	Zillmere Agricultural, Horticultural, and Industrial Society	Thos. Crompton ...	17 Sept.	

Societies and associations desirous of being registered and placed on the above list must make application to that effect, and forward to the Under Secretary for Agriculture and Stock the following particulars:—

Number of members who have paid their subscriptions for 1910.

Number of meetings held by the Society during 1910.

Date of the last meeting.

Name of the Secretary for 1911.

Departmental Announcements.

The EDITOR will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the EDITOR, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of SIXPENCE to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at ONE SHILLING each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, J. Mitchell; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, John Liverseed; Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Roma State Farm, manager, R. Soutter; State Farm, "Warren," Stanwell, manager, Thos. Jones; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

The Department has now prepared a booklet on "Flower Gardening for Amateurs," which may be obtained on application to the Under Secretary for Agriculture and Stock. Price, TWO SHILLINGS.

NOTICE OF SHOW DATES.

We wish to draw the attention of Secretaries of Agricultural and Pastoral Societies and Associations to the importance of promptly notifying the Editor of any change in the dates on which shows are to be held.

THE BOUNTIES ACT.

The Department of Agriculture and Stock have received from the Comptroller-General of Customs, Melbourne, a number of copies of "Memorandum for Information of Growers" and "Form of Notice of Intention to Claim Bounty" under the Commonwealth Bounties Act. Should any grower desire a copy of either the above, same will be supplied upon application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

"QUEENSLAND AGRICULTURAL JOURNAL."—GENERAL INDEX, VOLS. I. TO XXIV.

The GENERAL INDEX may be obtained on application to the Under Secretary, Department of Agriculture and Stock. Price: ONE SHILLING AND SIXPENCE.

DIRECTIONS FOR FORWARDING SPECIMENS

(ENTOMOLOGY AND PLANT PATHOLOGY).

NOTE.—Experience has shown that the opportunity of seeking the advice of the Entomologist and Vegetable Pathologist has not been embraced, owing to the lack of information regarding proper procedure for the transmission of specimens; also, that satisfactory information has not been accorded when, although this has not been the case, either no specimens at all have accompanied the application or such only as on arrival have been found to be—by reason of their condition—unsuitable for examination. Under these circumstances, the following Directions are issued for public information:—

INSECTS.

If it be desired that the insects be received whilst still alive, some of the food-plant—not superficially wet, however—should be included in the box containing them, and, also, a little dry crushed paper, as an absorbent of moisture. Insects frequenting soil—or wood—should be sent in these matter, and generally insects injurious to articles derived from plants or animals or to manufactured products should be forwarded in samples of these articles or substances. Holes should not be made in the boxes used, unless quite exceptionally—when they should be limited to two or three, and be quite small.

Plants or portions of plants, including fruit, tubers, &c., that may illustrate insect injury, should be sent as directed for plants subject to disease proper. (See “Plant Diseases.”) Such specimens may be of great interest.

Generally speaking, insects should be forwarded in a dead condition, the killing having been effected by the “cyanide bottle,” tobacco fumes or anæsthetic, for fragile examples—moths, flies, &c., for instance; and by these agencies or by immersion in spirits of wine, formalin, hot water, &c., for hard-bodied ones—beetles, plant-bugs, grasshoppers, &c.—and for insects generally not suffering damage through being made wet, such as caterpillars or grubs. Dead examples of the latter kinds should be sent in spirits of wine diluted with water 1 part in 4, formalin diluted with water 1 part in 20, or in gin or other alcoholic beverage; the phial containing them, completely filled with its contents, being packed in a “mailing tube,” perforated wooden block, section of bamboo stem, or strong box.

Hard-bodied insects that have been immersed in spirits or formalin may be removed from these fluids, and sent, whilst still moist, packed amidst sawdust to which a few drops of carbolic acid or oil of turpentine have been added; or, if killed in other ways, be allowed to become perfectly dry and packed then in this medicated substance, great care being exercised in handling in the latter case. Small insects, when dry, should be packed in shredded tissue paper scattered amongst them or between layers of this; cotton wool should never be used in contact with them.

Butterflies and moths should be sent pinned (in impaling them they should be placed on their sides and the pin thrust through their thorax or mid-body) to cork, cork linoleum, or pith fastened to the inside of the box. The finer lace pins are suitable for this purpose. Or butterflies—and moths in some instances—may be enclosed in papers folded into triangular-shaped packets, of sizes to match the respective insects, these afterwards being packed into a box with crushed paper, to prevent movement, and powdered “moth ball” (Naphthalene) to repel ants.

In some instances (Scale Insects, &c.) it will be necessary to send food plant (bark, stem, or leaf) and insect in association, each such specimen being simply wrapped in soft paper.

PLANT DISEASES.

PLANTS AND PORTIONS THEREOF.

These, if practicable, should be forwarded carefully packed so as to arrive in a condition approaching that exhibited when they were first procured. They should not be externally wet, however, or even damp—much less should their surfaces be moistened. If roots accompany the specimens, care should be taken

lest earth-particles therefrom soil the leaves or flowers; this may be secured by enclosing them in a paper or linen bag. Should circumstances not admit of their transmission in a fresh state, the specimens should be carefully dried between paper and under slight pressure only (not sufficient to quite flatten them out). They should be handled as little as possible either in gathering them, submitting them to this process, or in finally packing them. When being transmitted, they should be packed in soft paper between card or mill board. Any solid substance that will not quickly dry—roots or succulent stems, for example—and is liable to prompt decay, should be immersed in formalin 1 part in 20 water or in alcohol 1 part in 4 water prior to sending, and forwarded in this; or, after immersion for any period not less than 48 hours in one of these fluids, be taken out, wrapped in linen that has been moistened therewith, and enclosed in a tin box under conditions that will admit of moisture being conserved. In other cases—wood, fruit, tubers, &c.—the specimens may be forwarded securely packed in any ordinary manner.

GENERAL.

Specimens should be sent in fair number or amount, so as to afford the investigator full facilities for arriving at certain conclusions.

To identify insects and specimens generally with remarks submitted in writing relating to them, it is necessary that one example of each description in the packet, when this contains objects of more than one kind, be marked by having attached to it or otherwise associated with it a small label bearing a distinguishing number written in pencil. In the case of living specimens this should accompany each receptacle or packet devoted to the individuals of one kind.

When the names or other such facts of interest are sought, especially as aids in arranging collections of insects, &c., numbered duplicates should be sent, to be retained for reference or other purposes; it being understood that no return of specimens sent can be made generally, except by special arrangement.

POSTAL.

When specimens or the vessels containing them are liable to injury, either by concussion or pressure, whilst being transmitted, the package in which they are contained should be strong. Whilst fastened securely, this should not be done in such a way as to prevent inspection of its contents without its being broken. The address and stamp should be attached to a ticket distinct from the outside wrapper of the package, although this should bear the address repeated as well as the name of the sender. It should also be endorsed with a general statement of contents—*e.g.*, "Insects Only."

The charges for Packets by ordinary post are as follows:—1d. for 2 oz. or less, and 1d. for every additional 2 oz. or portion thereof. For those by Parcel Post—6d. for 1 lb. or less, and 3d. for every additional pound or portion thereof.

The address should be an official one, *e.g.*—

The Entomologist—Department of Agriculture and Stock, Brisbane.

And in every case a letter of advice should accompany each consignment.

Under special circumstances, the objects and materials necessary for the collection, preservation, and transmission of specimens may be provided.

DISEASES OF ANIMALS.—EXAMINATION OF SPECIMENS.

In accordance with an Order recently issued by the Minister for Agriculture, any persons deriving their principal means of livelihood from rural pursuits may have specimens, &c., examined by the Bacteriological Department free of charge. The Government Veterinary Surgeon, Mr. A. H. Cory, will at any time make examinations and report upon pathological specimens, &c., in connection with diseases of animals. When forwarding material, full particulars of the case should be given. The specimens should where possible, be wrapped in a cloth saturated with disinfectant before placing in the receptacle, securely packed, and forwarded with the history thereof, carriage prepaid, as quickly as possible to the Department of Agriculture and Stock, Brisbane.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

—:0:—

Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sending an order.

BLACKLEG VACCINE.

DOUBLE VACCINE (powder form) for the PREVENTION of BLACKLEG is now prepared by the Department of Agriculture and Stock, and may be obtained in Tubes containing not less than Ten Doses, at a cost of 3s. per Ten Double Doses.

Full Instructions for Use are sent with the Vaccine.

Applications for same must be accompanied by Remittance, and addressed to:—

THE GOVERNMENT BACTERIOLOGIST,

STOCK EXPERIMENT STATION,

YEERONGPILLY,

NEAR BRISBANE.

"THE QUEENSLAND FLORA"

BY F. MANSON BAILEY, F.L.S.,

Colonial Botanist of Queensland.

WITH PLATES ILLUSTRATING SOME RARE SPECIES.

IN SIX PARTS, OF BETWEEN 300 AND 400 PAGES EACH, ROYAL OCTAVO.

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Obtainable at the DEPARTMENT of AGRICULTURE and STOCK.

LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Baxter ...	2 Feb.	
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association ...	W. Jas. Sullivan ...		
Atherton ...	Atherton Agricultural, Pastoral, and Industrial Association	H. McKnight ...		
Atherton ...	Atherton and North Johnstone River District Farmers' Association	David Steel Imrie		
Atherton ...	Upper Barron and Malanda Farmers' Progress Association	A. G. Jones ...		
Ayr ...	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr ...	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Geo. S. Mackersie	18 and 19 May	
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	M. Selwyn Smith	15 Sept.	
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Gerald D. Savage	15 Sept.	8 Sept.
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Beenleigh ...	The Logan and Albert Canegrowers and Farmers' Association	Wm. Thorsborne ...		
Belli Creek, <i>via</i> Eumundi	Belli Creek Farmers' Progress Association	A. W. Richardson		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	21 and 22 July	6 and 7 July
Biggenden ...	Coalstown Lakes Farmers' Association	H. Radel ...		
Blackall ...	Barcoo Pastoral Society ...	...		
Blackbutt ...	Blackbutt Farmers' and Industrial Association	E. S. Innes ...		
Blenheim, <i>via</i> Laidley	Blenheim and District Farmers' Progress Association	W. A. Zerner ...		
Boonah ...	Fassifern Agricultural and Pastoral Association	H. R. Beverley ...	15 and 16 June	23 and 24 May
Booyal ...	Booyal Farmers' Progress Association	N. Rosenlund ...		
Bowen ...	Pastoral, Agricultural, and Mining Association	A. W. Kirke ...		
Bowen ...	Proserpine Farmers and Settlers' Association	J. Cooper ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowen ...	Bowen Farmers' Union ...	Thos. J. Mullan ...		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...		
Brisbane ...	Queensland Acclimatisation Society	Nicol Robinson ...		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, 11, 12, and 13 Aug.	7 to 12 Aug.
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Beekeepers' Association	George Butler ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Chamber of Agricultural Societies	C. A. Arvier		
Brisbane ...	Queensland Fruitgrowers' Industrial Trading Society	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ...		
Brisbane ...	Jersey Cattle Society of Queensland	Alfred Gorrie ...		
Brookfield ...	Brookfield, Pullen Vale, and Moggill Farmers' Association	F. B. Howard ...	20 July	23 and 24 May
Brooyar, <i>via</i> Gympie	Brooyar Farmers' Progress Association	E. J. Pike ...		
Buderim ...	Buderim Mountain Coffee and Fruitgrowers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Association ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	S. F. Luke ...	22, 23, and 24 Sept.	7 and 8 Sept.
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	M. W. Walker ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—continued.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Bundaberg (Maudsleigh)	Burnett Heads Canegrowers and Farmers' Association	R. O. Strathdee ...		
Byrnestown...	Byrnestown Farmers and Dairy-men's Association	Geo. H. Bomford ...		
Burpengary...	Burpengary Farmers' Association ...	F. W. Uhlmann ...		
Caboolture ...	Caboolture Progress and Farmers' Association	F. W. Uhlmann ...		
Cairns ...	Aloomba Farmers' Association ...	Hugh A. Niven ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	A. H. Clarke ...	15 and 16 Sept.	21 and 22 Sept.
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cairns ...	Hambledon Planters' Association ...	A. W. Hawkins ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Cawdor ...	Highfields and Cawdor Farmers' Association	H. Franken ...		
Cedar Pocket, <i>via</i> Gympie	Cedar Pocket Farmers' Progress Association	J. H. Jamieson ...		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell... ..	...	29 and 30 May
Charters Towers	Charters Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	28 and 29 June	
Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Charters Towers	The Towers Horticultural Society ...	Chas. E. Parkinson	...	
Childers ...	Isis Agricultural Association	H. Epps		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	R. S. Rankin ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	John R. Wrench ...	26 and 27 May	8 and 9 June
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Chinchilla ...	Chinchilla Agricultural and Pastoral Association	F. E. Dare	6 April	5 April
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley		
Clermont ...	Peak Downs Dairymen and Settlers' Association	P. Noonan... ..		
Cleveland ...	Cleveland Horticultural Society ...	Miles R. Fox		
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. C. Mott... ..		
Columboola...	The Columboola Farmers and Settlers' Association	Geo. T. Sutton ...		
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooktown ...	Cook District Pastoral, Agricultural, Mining, and Industrial Association	E. A. S. Olive ...		
Cooran ...	Cooran Progress and Agricultural Association	A. Booth		
Cooroy ...	Cooroy Progress and Farmers' Association	A. S. Douglas ...		
Cooyar ...	Yeraman Creek Farmers' Progress Association	M. Harland		
Coringa, <i>via</i> Degilbo	North Dalaruil and Coringa Progress Association	John Leslie		
Coulson ...	Coulson Farmers' Progress Association	G. A. Lewald		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 and 27 July	
Croydon ...	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh		
Cunnamulla	South Warrego Pastoral Association	J. Wirward		
Dalby ...	Northern Downs Pastoral and Agricultural Association	Walter R. Hunter	...	10 and 11 May
Dallarnil Scrub, <i>via</i> Degilbo	Dallarnil Farmers and Dairymen's Progress Association	H. J. Piper		
Degilbo ...	Degilbo District Farmers and Dairymen's Association	Thos. Brennan ...		
Degilbo ...	Emu Creek Farmers and Dairymen's Progress Association	Percy Harrison ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—continued.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Didcot ...	Didcot Farmers and Settlers' Association	D. B. Hamilton ...		
Dugandan ...	Dugandan Farmers' Progress Association	John M. Court ...		
Dundowran, via Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk ...	Esk Pastoral, Agricultural, and Industrial Association	J. G. Smith ...	...	9 and 10 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Evergreen ...	Evergreen Farmers Progress Association	H. Rickert ...		
Flagstone Ck., via Helidon	Flagstone Creek Farmers' Progress Association	Geo. J. Deller ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	P. G. Woolley ...		
Fordsdale, via Grantham	The Fordsdale and Mount White-stone Farmers' Progress Association	W. M. Ridley ..		
Gayndah ...	Gayndah Pastoral, Industrial, Agricultural, and Horticultural Association	M. C. Stephenson	5 and 6 July	6 and 7 June
Gayndah ...	Reid's Creek Farmers' Progress Association	R. E. Wragge ...		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	W. Stevenson ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	Chas. M. Morris ...	2 June	
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. F. W. Brown ...	24 and 25 May	23 and 24 May
Gooburrum, Bundaberg	Gooburrum Farmers and Cane-growers' Association	W. J. Tutin ...		
Goombungee	Goombungee Farmers' Association ...	Thos. Smith ...	23 Feb.	
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	27 and 28 April	5 and 6 April
Goondoon ...	Goondoon Farmers' Association ...	H. English... ..		
Gooroolba ...	Gooroolba Farmers' and Settlers' Association	J. Richards ...		
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher...		
Grayson, via Warwick	Grayson Farmers' Progress Association	W. G. Skerman, junr.		
Gunalda ...	Gunalda Farmers' Progress Association	D. J. Caille ...		
Gympie ...	Agricultural, Mining, and Pastoral Association	F. Vaughan ...	14 and 15 Sept.	13 and 14 Sept.
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen ..		
Gympie ...	Gympie Horticultural Society	Charles Brasch ...		
Gympie ...	Woondum and Brisbane Road Farmers' Progress Association	J. Mullaly ...		
Gympie ...	Woondum and Mary River Farmers' and Progress Association	F. W. Johns ...		
Gympie ...	Combined Farmers' Association ...	W. Allen ...	3 and 4 June	
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Hatton Vale	Hatton Vale Farmers' Progress Association	W. H. Pimlott ...		
Headington Hill	Queensland Farmers' Association ...	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withecott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	...		
Herbert River	Halifax Planters' Club ...	A. Campbell ..		
Herbert River	Macknade Farmers' Association ...	Edwin S. Waller ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ..	Mining, Pastoral, and Agricultural Association	John M. Hollway	28 Mar.	

AGRICULTURAL AND HORTICULTURAL SOCIETIES—continued.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Hodgson ...	Hodgson and Dargal Farmers' Association	I. Stevenson ...		
Hughenden ...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	13 and 14 June	
Ideraway ...	Ideraway Farmers' Progress Association	L. Kirkley ...		
Ingham ...	Herbert River Pastoral and Agricultural Association	E. Blackmore ...	23 and 24 Sept.	
Ingham ...	Stone River Farmers' Association ...	W. B. G. Johnson ...		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	W. J. McGill ...		
Ipswich ...	Queensland Pastoral and Agricultural Society	G. W. Allen ...	27 and 29 April	26 and 28 April
Ipswich ...	The Amberley Farmers' Progress Association	Clark T. Seymour ...		
Ithaca ...	Ithaca Progress Association ...	Jas. Greenaway ...		
Kelsey Creek via Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kilcoy ...	Kilcoy Pastoral, Agricultural, and Progress Association	John Walsh ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	M. Bambling ...		
Killarney ...	Killarney Agricultural Society ...	...	9 and 10 Feb.	1 and 2 March
Kingaroy ...	Kingaroy Farmers' Association ...	C. H. Hooper ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	R. W. Whitehead ...	27 and 28 April	19 and 20 April
Kooroongarra	Kooroongarra Farmers' Progress Association	A. E. Markey ...	20 and 21 July	
Laidley ...	Laidley Agricultural and Industrial Society (at Laidley)	W. A. McIlwraith ...		26 and 27 July
Lake Cootharaba	Lake Cootharaba Agricultural Progress Association	R. S. Johnston ...	2 and 3 May	
Lakeside ...	Mungore Farmers' Association ...	A. Reedman ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	11 and 12 May	10 and 11 May
Lowood ...	The Lowood and Tarampa Pastoral and Agricultural Association	J. E. Midgley ...		17 and 18 May
Ma Ma Creek, via Grantham	Ma Ma Creek Farmers' Progress Association	A. McKenzie ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black ...	14 and 15 June	
Mackay ...	Pioneer River Farmers and Graziers' Association	J. P. Moule ...		21 and 22 June
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...	24, 25, and 26 May	
Mareeba ...	Mareeba Mining, Pastoral, and Agricultural Association	F. Cruckshank ...		
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.	22, 23, and 24 June	
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	J. H. Jones ...		13, 14, and 15 June
Millmerran ...	Herries Farmers and Settlers' Association	A. Hawthorn ...		
Miriam Vale	Miriam Vale Farmers' Association ...	J. Spencer ...		
Mitchell ...	Maranoa Pastoral, Agricultural, and Industrial Association	Neil Hammond ...		23 and 24 May
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	Hy. Hopkins ...		
Mooloolah ...	The Mooloolah and Glenview Progress Association	A. H. Paget ...		
Mosman ...	Mosman Farmers' Association ...	R. D. Rex ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mourilyan ...	Mourilyan Canegrowers' Association	A. D. Campbell ...		
Murray's Creek	Murray and Baffle Creek Progress and Farmers' Association	T. J. Gee ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Nambour ...	Dulong and Kureelpa Farmers and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	Obi Obi Farmers and Dairymen's Progressive Association	H. Robinson ...		
Nambour ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	A. H. Bushnell ...	20 and 21 July	4 and 5 Oct.
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. D. Hamilton ...	20 April	
North Pine ...	The Pine Rivers Agricultural, Horticultural, and Industrial Association	A. D. Stewart ...	...	7 and 8 July
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. Cecil Colledge		
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
Oakey, <i>via</i> Eumundi	Kenilworth Farmers' Association ...	H. Hansen ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace ...		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	J. E. Stanton ...		
Palmwoods ...	Palmwoods Central Horticultural Progress Association	H. W. Major ...		
Peachester, <i>via</i> Beerwah, N.C. Line	The Peachester Progress Association	W. Vieritz ...		
Pelican ...	The Pelican Farmers and Settlers' Progress Association	H. K. Nevel ...		
Pickanjenie	The Pickanjenie Farmers' Progress Association	J. Bickerstaff ...		
Pie and Eel Creek	Pie and Eel Creek Farmers' Progress Association	David Webster, junr.		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	L. G. Sims ...	26 Jan.	25 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. J. Scott ...		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	H. McMahon ...		
Proserpine ...	Preston Farmers and Settlers' Association	W. B. Morgan ...		
Proserpine ...	Preston Farmers and Canegrowers' Association	R. C. Dagg ...		
Proserpine ...	Cannon Valley and District Farmers' Progress Association	W. A. Compton ...		
Queenton, <i>via</i> Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Roadvale ...	Roadvale Progress Association ...	Henry Clark ...		
Rockhampton	Alton Downs Farmers' Association...	G. T. Crook ...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		
Rockhampton	Mount Etna Farmers and Selectors' Progress Association	G. Smith ...		
Rockhampton	Rockhampton Agricultural Society...	H. Hill ...	9, 10, and 11 June	8, 9, and 10 June
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	...	16 and 10 May
Roma (Blythdale)	Warrooby Farmers' Association ...	Geo. Munt... ..		
Roma ...	Euthulla Farmers and Fruitgrowers' Association	J. Bates ...		
Roma ...	The United Maranoa Farmers' Association	R. Frederick, senr.		
Rosedale ...	The Rosedale and Tottenham Agricultural Society	F. Guérin ...		
Rosewood ...	Rosewood Farmers' Club ...	W. G. S. Blackmore	22 and 23 June	
Southport ...	Southport Horticultural Society ...	E. Fass ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Springsure ...	Springsure Pastoral and Agricultural Society	W. Fisher ...	19 and 20 May	18 and 19 May
Stanthorpe ..	Border Agricultural, Horticultural, and Pastoral and Mining Society	Geo. Simcocks ...	10 and 11 Feb.	2 and 3 Feb.
St. George ...	Balonne Pastoral and Agricultural Society	T. M. Cummings ...		
Sydney ...	Royal Agricultural Society of New South Wales	...	22 to 30 March	
Tabragalba ...	Tabragalba and Canungra Farmers' Progress Association	A R. Ludwig ...		
Takura (Pialba line)	Takura Farmers' Progress Association	W. J. Sorensen ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Thornton ...	Thornton Farmers' Progress Association	Geo. W. Drevesen		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ..		
Tingoorra ...	Tingoorra Farmers' Progress Association	T. E. Campbell ...		
Tolga ...	Rocky Creek District Farmers' Association	N. A. R. Pollock ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	19, 20, 21, 22 April	2, 3, and 4 May
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	24 and 25 May	27 and 28 June
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Wallumbilla	Wallumbilla Farmers' Association ...	A. Budd ...		
Warren ...	Woodend Farmers' Club ...	W. Lehfeldt ...		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15, 16, and 17 Feb.	15, 15, and 16 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	P. Hardgrave ...	23 July	
West Haldon, <i>via</i> Greenmount	West Haldon Farmers' Progress Association	C. J. Byron ...		
Wondai ...	Mondure Farmers' Progress Association	G. W. Roseby ...		
Wondai ...	Wondai Farmers' Progress Association	W. W. Finnimore	...	10 and 11 May
Woolloongabba	Queensland Dairy Herdbook Society	Alfred Gorrie ...		
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Wooroolin ...	Wooroolin Farmers' Progress Association	A. Deighton ...		
Wooroolin (Memerambi Siding)	Memerambi Farmers' Progress Association	J. E. Reid ...		
Yandina ...	Maroochy River Farmers' Union and Progress Association	W. R. Brayden ...		
Yerra (Mungar Junction)	Yerra District Farmers' Progress Association	H. W. Williamson		
Yingerbay ...	Yingerbay Farmers' Association ...	R. Frederick ...		
Zillmere ...	Zillmere Agricultural, Horticultural, and Industrial Society	Thos. Crompton ...	17 Sept.	

Societies and associations desirous of being registered and placed on the above list must make application to that effect, and forward to the Under Secretary for Agriculture and Stock the following particulars:—

Number of members who have paid their subscriptions for 1910.

Number of meetings held by the Society during 1910.

Date of the last meeting.

Name of the Secretary for 1911.

Departmental Announcements.

The EDITOR will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the EDITOR, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of SIXPENCE to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at ONE SHILLING each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, J. Mitchell; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, John Liverseed; Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Roma State Farm, manager, R. Soutter; State Farm, "Warren," Stanwell, manager, Thos. Jones; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

The Department has now prepared a booklet on "Flower Gardening for Amateurs," which may be obtained on application to the Under Secretary for Agriculture and Stock. Price, TWO SHILLINGS.

NOTICE OF SHOW DATES.

We wish to draw the attention of Secretaries of Agricultural and Pastoral Societies and Associations to the importance of promptly notifying the Editor of any change in the dates on which shows are to be held.

THE BOUNTIES ACT.

The Department of Agriculture and Stock have received from the Comptroller-General of Customs, Melbourne, a number of copies of "Memorandum for Information of Growers" and "Form of Notice of Intention to Claim Bounty" under the Commonwealth Bounties Act. Should any grower desire a copy of either the above, same will be supplied upon application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

"QUEENSLAND AGRICULTURAL JOURNAL."—GENERAL INDEX, VOLS. I. TO XXIV.

The GENERAL INDEX may be obtained on application to the Under Secretary, Department of Agriculture and Stock. Price: ONE SHILLING AND SIXPENCE.

DIRECTIONS FOR FORWARDING SPECIMENS

(ENTOMOLOGY AND PLANT PATHOLOGY).

NOTE.—Experience has shown that the opportunity of seeking the advice of the Entomologist and Vegetable Pathologist has not been embraced, owing to the lack of information regarding proper procedure for the transmission of specimens; also, that satisfactory information has not been accorded when, although this has not been the case, either no specimens at all have accompanied the application or such only as on arrival have been found to be—by reason of their condition—unsuitable for examination. Under these circumstances, the following Directions are issued for public information:—

INSECTS.

If it be desired that the insects be received whilst still alive, some of the food-plant—not superficially wet, however—should be included in the box containing them, and, also, a little dry crushed paper, as an absorbent of moisture. Insects frequenting soil—or wood—should be sent in these matter, and generally insects injurious to articles derived from plants or animals or to manufactured products should be forwarded in samples of these articles or substances. Holes should not be made in the boxes used, unless quite exceptionally—when they should be limited to two or three, and be quite small.

Plants or portions of plants, including fruit, tubers, &c., that may illustrate insect injury, should be sent as directed for plants subject to disease proper. (See “Plant Diseases.”) Such specimens may be of great interest.

Generally speaking, insects should be forwarded in a dead condition, the killing having been effected by the “cyanide bottle,” tobacco fumes or anæsthetic, for fragile examples—moths, flies, &c., for instance; and by these agencies or by immersion in spirits of wine, formalin, hot water, &c., for hard-bodied ones—beetles, plant-bugs, grasshoppers, &c.—and for insects generally not suffering damage through being made wet, such as caterpillars or grubs. Dead examples of the latter kinds should be sent in spirits of wine diluted with water 1 part in 4, formalin diluted with water 1 part in 20, or in gin or other alcoholic beverage; the phial containing them, completely filled with its contents, being packed in a “mailing tube,” perforated wooden block, section of bamboo stem, or strong box.

Hard-bodied insects that have been immersed in spirits or formalin may be removed from these fluids, and sent, whilst still moist, packed amidst sawdust to which a few drops of carbolic acid or oil of turpentine have been added; or, if killed in other ways, be allowed to become perfectly dry and packed then in this medicated substance, great care being exercised in handling in the latter case. Small insects, when dry, should be packed in shredded tissue paper scattered amongst them or between layers of this; cotton wool should never be used in contact with them.

Butterflies and moths should be sent pinned (in impaling them they should be placed on their sides and the pin thrust through their thorax or mid-body) to cork, cork linoleum, or pith fastened to the inside of the box. The finer lace pins are suitable for this purpose. Or butterflies—and moths in some instances—may be enclosed in papers folded into triangular-shaped packets, of sizes to match the respective insects, these afterwards being packed into a box with crushed paper, to prevent movement, and powdered “moth ball” (Naphthalene) to repel ants.

In some instances (Scale Insects, &c.) it will be necessary to send food-plant (bark, stem, or leaf) and insect in association, each such specimen being simply wrapped in soft paper.

PLANT DISEASES.

PLANTS AND PORTIONS THEREOF.

These, if practicable, should be forwarded carefully packed so as to arrive in a condition approaching that exhibited when they were first procured. They should not be externally wet, however, or even damp—much less should their surfaces be moistened. If roots accompany the specimens, care should be taken

lest earth-particles therefrom soil the leaves or flowers; this may be secured by enclosing them in a paper or linen bag. Should circumstances not admit of their transmission in a fresh state, the specimens should be carefully dried between paper and under slight pressure only (not sufficient to quite flatten them out). They should be handled as little as possible either in gathering them, submitting them to this process, or in finally packing them. When being transmitted, they should be packed in soft paper between card or mill board. Any solid substance that will not quickly dry—roots or succulent stems, for example—and is liable to prompt decay, should be immersed in formalin 1 part in 20 water or in alcohol 1 part in 4 water prior to sending, and forwarded in this; or, after immersion for any period not less than 48 hours in one of these fluids, be taken out, wrapped in linen that has been moistened therewith, and enclosed in a tin box under conditions that will admit of moisture being conserved. In other cases—wood, fruit, tubers, &c.—the specimens may be forwarded securely packed in any ordinary manner.

GENERAL.

Specimens should be sent in fair number or amount, so as to afford the investigator full facilities for arriving at certain conclusions.

To identify insects and specimens generally with remarks submitted in writing relating to them, it is necessary that one example of each description in the packet, when this contains objects of more than one kind, be marked by having attached to it or otherwise associated with it a small label bearing a distinguishing number written in pencil. In the case of living specimens this should accompany each receptacle or packet devoted to the individuals of one kind.

When the names or other such facts of interest are sought, especially as aids in arranging collections of insects, &c., numbered duplicates should be sent, to be retained for reference or other purposes; it being understood that no return of specimens sent can be made generally, except by special arrangement.

POSTAL.

When specimens or the vessels containing them are liable to injury, either by concussion or pressure, whilst being transmitted, the package in which they are contained should be strong. Whilst fastened securely, this should not be done in such a way as to prevent inspection of its contents without its being broken. The address and stamp should be attached to a ticket distinct from the outside wrapper of the package, although this should bear the address repeated as well as the name of the sender. It should also be endorsed with a general statement of contents—*e.g.*, "Insects Only."

The charges for Packets by ordinary post are as follows:—1d. for 2 oz. or less, and 1d. for every additional 2 oz. or portion thereof. For those by Parcel Post—6d. for 1 lb. or less, and 3d. for every additional pound or portion thereof.

The address should be an official one, *e.g.*—

The Entomologist—Department of Agriculture and Stock, Brisbane.

And in every case a letter of advice should accompany each consignment.

Under special circumstances, the objects and materials necessary for the collection, preservation, and transmission of specimens may be provided.

DISEASES OF ANIMALS.—EXAMINATION OF SPECIMENS.

In accordance with an Order recently issued by the Minister for Agriculture, any persons deriving their principal means of livelihood from rural pursuits may have specimens, &c., examined by the Bacteriological Department free of charge. The Government Veterinary Surgeon, Mr. A. H. Cory, will at any time make examinations and report upon pathological specimens, &c., in connection with diseases of animals. When forwarding material, full particulars of the case should be given. The specimens should where possible, be wrapped in a cloth saturated with disinfectant before placing in the receptacle, securely packed, and forwarded with the history thereof, carriage prepaid, as quickly as possible to the Department of Agriculture and Stock, Brisbane.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

—:O:—

Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sending an order.

BLACKLEG VACCINE.

DOUBLE VACCINE (powder form) for the PREVENTION of BLACK-LEG is now prepared by the Department of Agriculture and Stock, and may be obtained in Tubes containing not less than Ten Doses, at a cost of 3s. per Ten Double Doses.

Full Instructions for Use are sent with the Vaccine.

Applications for same must be accompanied by Remittance, and addressed to:—

THE GOVERNMENT BACTERIOLOGIST,

STOCK EXPERIMENT STATION,

YEERONGPILLY,

NEAR BRISBANE.

“THE QUEENSLAND FLORA”

By F. MANSON BAILEY, F.L.S.,

Colonial Botanist of Queensland.

WITH PLATES ILLUSTRATING SOME RARE SPECIES.

IN SIX PARTS, OF BETWEEN 300 AND 400 PAGES EACH, ROYAL OCTAVO.

Price, £1 10s. for Complete Work.

Obtainable at the DEPARTMENT of AGRICULTURE and STOCK.

LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Baxter ...	2 Feb.	
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association ...	W. Jas. Sullivan ...		
Atherton ...	Atherton Agricultural, Pastoral, and Industrial Association	H. McKnight ...		
Atherton ...	Atherton and North Johnstone River District Farmers' Association	David Steel Imrie		
Atherton ...	Upper Barron and Malanda Farmers' Progress Association	A. G. Jones ...		
Ayr ...	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr ...	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Geo. S. Mackersie	18 and 19 May	
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	M. Selwyn Smith	15 Sept.	
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Gerald D. Savage	15 Sept.	8 Sept.
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Beenleigh ...	The Logan and Albert Canegrowers and Farmers' Association	Wm. Thorsborne ...		
Belli Creek, <i>via</i> Eumundi	Belli Creek Farmers' Progress Association	A. W. Richardson		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	21 and 22 July	6 and 7 July
Biggenden ...	Coalstown Lakes Farmers' Association	H. Radel ...		
Blackall ...	Barcoo Pastoral Society ...	E. S. Innes ...		
Blackbutt ...	Blackbutt Farmers' and Industrial Association			
Blenheim, <i>via</i> Laidley	Blenheim and District Farmers' Progress Association	W. A. Zerner ...		
Boonah ...	Fassifern Agricultural and Pastoral Association	H. R. Beverley ...	15 and 16 June	23 and 24 May
Booyal ...	Booyal Farmers' Progress Association	N. Rosenlund ...		
Bowen ...	Pastoral, Agricultural, and Mining Association	A. W. Kirke ...		
Bowen ...	Proserpine Farmers and Settlers' Association	J. Cooper ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowen ...	Bowen Farmers' Union ...	Thos. J. Mullan ...		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...		
Brisbane ...	Queensland Acclimatisation Society	Nicol Robinson ...		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, 11, 12, and 13 Aug.	7 to 12 Aug.
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Beekeepers' Association	George Butler ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Chamber of Agricultural Societies	C. A. Arvier ...		
Brisbane ...	Queensland Fruitgrowers' Industrial Trading Society	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ...		
Brisbane ...	Jersey Cattle Society of Queensland	Alfred Gorrie ...		
Brookfield ...	Brookfield, Pullen Vale, and Mogill Farmers' Association	F. B. Howard ...	20 July	23 and 24 May
Brooyar, <i>via</i> Gympie	Brooyar Farmers' Progress Association	E. J. Pike ...		
Buderim ...	Buderim Mountain Coffee and Fruitgrowers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Association ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	S. F. Luke ...	22, 23, and 24 Sept.	7 and 8 Sept.
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	M. W. Walker ...		
Bundaberg (Maudsleigh)	Burnett Heads Canegrowers and Farmers' Association	R. O. Strathdee ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Byrnestown...	Byrnestown Farmers and Dairy-men's Association	Geo. H. Bomford ...		
Burpengary...	Burpengary Farmers' Association ..	F. W. Uhlmann ...		
Caboolture ...	Caboolture Progress and Farmers' Association	F. W. Uhlmann ...		
Cairns ...	Aloomba Farmers' Association ...	Hugh A. Niven ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	A. H. Clarke ...	15 and 16 Sept.	21 and 22 Sept.
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cairns ...	Hambledon Planters' Association ...	A. W. Hawkins ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Cawdor ...	Highfields and Cawdor Farmers' Association	H. Franken ...		
Cedar Pocket, <i>via</i> Gympie	Cedar Pocket Farmers' Progress Association	J. H. Jamieson ...		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell ...	...	29 and 30 May
Charters Towers	Charters Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	28 and 29 June	
Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Charters Towers	The Towers Horticultural Society ...	J. H. Chappel ...	...	
Childers ...	Isis Agricultural Association ...	H. Epps ...		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	R. S. Rankin ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps ...		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	John R. Wrench ...	26 and 27 May	22 and 23 June
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Chinchilla ...	Chinchilla Agricultural and Pastoral Association	F. E. Dare ...	6 April	5 April
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley ...		
Clermont ...	Peak Downs Dairymen and Settlers' Association	P. Noonan ...		
Cleveland ...	The Cleveland Horticultural, Agricultural, and Industrial Society	W. H. Ridley ...	...	15 July
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. C. Mott ...		
Columboola...	The Columboola Farmers and Settlers' Association	Geo. T. Sutton ...		
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooktown ...	Cook District Pastoral, Agricultural, Mining, and Industrial Association	E. A. S. Olive ...	...	21 and 22 June
Cooran ...	Cooran Progress and Agricultural Association	A. Booth ...		
Cooroy ...	Cooroy Progress and Farmers' Association	A. S. Douglas ...		
Cooyar ...	Yeraman Creek Farmers' Progress Association	M. Harland ...		
Coringa, <i>via</i> Degilbo	North Dalaruil and Coringa Progress Association	John Leslie ...		
Coulson ...	Coulson Farmers' Progress Association	G. A. Lewald ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 and 27 July	11 and 12 July
Croydon ..	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh ...		
Cunnamulla	South Warrego Pastoral Association	J. Winward ...		
Dalby ...	Northern Downs Pastoral and Agricultural Association	Walter R. Hunter	...	10 and 11 May
Dallaruil Scrub, <i>via</i> Degilbo	Dallaruil Farmers and Dairymen's Progress Association	H. J. Piper ...		
Degilbo ...	Degilbo District Farmers and Dairymen's Association	Thos. Brennan ...		
Degilbo ...	Emu Creek Farmers and Dairymen's Progress Association	Percy Harrison ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Didcot ...	Didcot Farmers and Settlers' Association	D. B. Hamilton ...		
Dugandan ...	Dugandan Farmers' Progress Association	John M. Court ...		
Dundowran, via Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk ...	Esk Pastoral, Agricultural, and Industrial Association	J. G. Smith ...	...	9 and 10 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Evergreen ...	Evergreen Farmers Progress Association	H. Rickert ...		
Flagstone Ck., via Helidon	Flagstone Creek Farmers' Progress Association	Geo. J. Deller ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	P. G. Woolley ...		
Fordsdale, via Grantham	The Fordsdale and Mount White-stone Farmers' Progress Association	W. M. Ridley ..		
Gayndah ...	Gayndah Pastoral, Industrial, Agricultural, and Horticultural Association	M. C. Stephenson	5 and 6 July	6 and 7 June
Gayndah ...	Reid's Creek Farmers' Progress Association	R. E. Wragge ...		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	W. Stevenson ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	Chas. M. Morris ...	2 June	
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. F. W. Brown ...	24 and 25 May	23 and 24 May
Gooburrum, Bundaberg	Gooburrum Farmers and Cane-growers' Association	W. J. Tutin		
Goombungee	Goombungee Farmers' Association...	Thos. Smith ...	23 Feb.	
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	27 and 28 April	5 and 6 April
Goondoon ...	Goondoon Farmers' Association ...	H. English...		
Gooroolba ...	Gooroolba Farmers' and Settlers' Association	J. Richards ...		
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher...		
Grayson, via Warwick	Grayson Farmers' Progress Association	W. G. Skerman, junr.		
Gunalda ...	Gunalda Farmers' Progress Association	D. J. Caille ...		
Gympie ...	Agricultural, Mining, and Pastoral Association	F. Vaughan ...	14 and 15 Sept.	13 and 14 Sept.
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen ..		
Gympie ...	Gympie Horticultural Society	Charles Brasch ...		
Gympie ...	Woondum and Brisbane Road Farmers' Progress Association	J. Mullaly ...		
Gympie ...	Woondum and Mary River Farmers' and Progress Association	F. W. Johns ...		
Gympie ...	Combined Farmers' Association ...	W. Allen ...	3 and 4 June	
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Hatton Vale	Hatton Vale Farmers' Progress Association	W. H. Pimlott ...		
Headington Hill	Queensland Farmers' Association ...	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withecott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	...		
Herbert River	Halifax Planters' Club ...	A. Campbell ...		
Herbert River	Macknade Farmers' Association ...	Edwin S. Waller ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Holloway	28 Mar.	17 and 18 April

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Hodgson ...	Hodgson Farmers' Association ...	V. R. Speechley ...		
Hughenden...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	13 and 14 June	
Ideraway ...	Ideraway Farmers' Progress Association	L. Kirkley ...		
Ingham ...	Herbert River Pastoral and Agricultural Association	J. R. Mathewson ...	23 and 24 Sept.	8 and 9 Sept.
Ingham ...	Stone River Farmers' Association ...	W. B. G. Johnson		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	W. J. McGill ...		
Ipswich ...	Queensland Pastoral and Agricultural Society	G. W. Allen ...	27 and 29 April	26 and 28 April
Ipswich ...	The Amberley Farmers' Progress Association	Clark T. Seymour ...		
Ithaca ...	Ithaca Progress Association ...	Jas. Greenaway ...		
Kelsey Creek via Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kilcoy ...	Kilcoy Pastoral, Agricultural, and Progress Association	John Walsh ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	M. Bambling ...		
Killarney ...	Killarney Agricultural Society ...	...	9 and 10 Feb.	1 and 2 March
Kingaroy ...	Kingaroy Farmers' Association ...	C. H. Hooper ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	R. W. Whitehead	27 and 28 April	19 and 20 April
Kooroongarra	Kooroongarra Farmers' Progress Association	A. E. Markey ...	20 and 21 July	
Laidley ...	Lockyer Agricultural and Industrial Society (at Laidley)	W. A. McIlwraith		26 and 27 July
Lake Cootharaba	Lake Cootharaba Agricultural Progress Association	Reg. S. Johnston ...	2 and 3 May	
Lakeside ...	Mungore Farmers' Association ...	A. Reedman ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	11 and 12 May	10 and 11 May
Lowood ...	The Lowood and Tarampa Pastoral and Agricultural Association	J. E. Midgley ...		17 and 18 May
Ma Ma Creek, via Grantham	Ma Ma Creek Farmers' Progress Association	A. McKenzie ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black ...	14 and 15 June	
Mackay ...	Pioneer River Farmers and Graziers' Association	J. P. Moule ...		21 and 22 June
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...	24, 25, and 26 May	
Mareeba ...	Mareeba Mining, Pastoral, and Agricultural Association	F. Cruickshank ...		
Maryborough	Maryborough Horticultural Society...	H. A. Jone ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.	22, 23, and 24 June	
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	J. H. Jones ...		13, 14, and 15 June
Millmerran ...	Herries Farmers and Settlers' Association	A. Hawthorn ...		
Miriam Vale	Miriam Vale Farmers' Association...	J. Spencer ...		
Mitchell ...	Maranoa Pastoral, Agricultural, and Industrial Association	Neil Hammond ...		23 and 24 May
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	Hy. Hopkins ...		
Mooloolah ..	The Mooloolah and Glenview Progress Association	A. H. Paget ...		
Mosman ...	Mosman Farmers' Association ...	R. D. Rex ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mourilyan ...	Mourilyan Canegrowers' Association	A. D. Campbell ...		
Murray's Creek	Murray and Baffle Creek Progress and Farmers' Association	T. J. Gee ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Nambour ...	Dulong and Kureelipa Farmers and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	Obi Obi Farmers and Dairymen's Progressive Association	H. Robinson ...		
Nambour ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	A. H. Bushnell ...	20 and 21 July	12 and 13 July
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. D. Hamilton ...	20 April	4 and 5 April
North Pine ...	The Pine Rivers Agricultural, Horticultural, and Industrial Association	A. D. Stewart ...	...	7 and 8 July
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. Cecil Colledge		
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
Oakey, <i>via</i> Eumundi	Kenilworth Farmers' Association	H. Hansen ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace ...		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	J. E. Stanton ...		
Palmwoods ...	Palmwoods Central Horticultural Progress Association	H. W. Major ...		
Peacheater, <i>via</i> Beerwah, N.C. Line	The Peacheater Progress Association	W. Vieritz ...		
Pelican ...	The Pelican Farmers and Settlers' Progress Association	H. K. Nevel ...		
Pickanjenie	The Pickanjenie Farmers' Progress Association	J. Bickerstaff ...		
Pie and Eel Creek	Pie and Eel Creek Farmers' Progress Association	David Webster, junr.		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	L. G. Sims ...	26 Jan.	25 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. J. Scott ...		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	H. McMahon ...		
Proserpine ...	Preston Farmers and Settlers' Association	W. B. Morgan ...		
Proserpine ...	Preston Farmers and Canegrowers' Association	R. C. Dagg ...		
Proserpine ...	Cannon Valley and District Farmers' Progress Association	W. A. Compton ...		
Queenton, <i>via</i> Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Roadvale ...	Roadvale Progress Association	Henry Clark ...		
Rockhampton	Alton Downs Farmers' Association	G. T. Crook ...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		
Rockhampton	Mount Etna Farmers and Selectors' Progress Association	G. Smith ...		
Rockhampton	Rockhampton Agricultural Society	H. Hill ...	9, 10, and 11 June	8, 9, and 10 June
Roma	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	...	16 and 17 May
Roma (Blythdale)	Warrooby Farmers' Association	Geo. Munt ...		
Roma ...	Euthulla Farmers and Fruitgrowers' Association	J. Bates ...		
Roma ...	The United Maranoa Farmers' Association	R. Frederick, senr.		
Rosedale ...	The Rosedale and Tottenham Agricultural Society	F. Guérin ...		
Rosewood ...	Rosewood Farmers' Club	W. G. S. Blackmore	22 and 23 June	30 and 31 Aug.
Southport ...	Southport Horticultural Society	E. Foss ...	...	
Springure ...	Springure Pastoral and Agricultural Society	W. Fisher ...	19 and 20 May	18 and 19 May

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Stanthorpe ...	Border Agricultural, Horticultural, and Pastoral and Mining Society	Geo. Simcocks ...	10 and 11 Feb.	2 and 3 Feb.
St. George ...	Balonne Pastoral and Agricultural Society	T. M. Cummings ...		
Sydney ...	Royal Agricultural Society of New South Wales	...	22 to 30 March	
Tabragalba ...	Tabragalba and Canungra Farmers' Progress Association	A R. Ludwig ...		
Takura (Pialba line)	Takura Farmers' Progress Association	W. J. Sorensen ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Thornton ...	Thornton Farmers' Progress Association	Geo. W. Drevesen		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Tingoora ...	Tingoora Farmers' Progress Association	T. E. Campbell ...		
Tolga ...	Rocky Creek District Farmers' Association	N. A. R. Pollock ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	19, 20, 21, 22 April	2, 3, and 4 May
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	24 and 25 May	27 and 28 June
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Wallumbilla	Wallumbilla Farmers' Association ...	A. Budd ...		
Warren ...	Woodend Farmers' Club ...	W. Lehfeldt ...		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15, 16, and 17 Feb.	15, 15, and 16 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	P. Hardgrave ...	23 July	
West Haldon, <i>via</i> Greenmount	West Haldon Farmers' Progress Association	C. J. Byron ...		
Wondai ...	Mondure Farmers' Progress Association	G. W. Roseby ...		
Wondai ...	Wondai Farmers' Progress Association	W. W. Finnimore ...	...	10 and 11 May
Wondai ...	Pastoral, Agricultural, and Industrial Society	C. B. Armstrong ...	...	10 and 11 May
Woolloom-gabba	Queensland Dairy Herdbook Society	Alfred Gorrie ...		
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Woombye ...	North Coast Agricultural and Horticultural Society	James McConachie ...	...	9 June
Wooroolin ...	Wooroolin Farmers' Progress Association	A. Deighton ...		
Wooroolin (Memerambi Siding)	Memerambi Farmers' Progress Association	J. E. Reid ...		
Yandina ...	Maroochy River Farmers' Union and Progress Association	W. R. Brayden ...		
Yerra (Mungar Junction)	Yerra District Farmers' Progress Association	H. W. Williamson		
Yingerbay ...	Yingerbay Farmers' Association ...	R. Frederich ...		
Zillmere ...	Zillmere Agricultural, Horticultural, and Industrial Society	Thos. Crompton ...	17 Sept.	

Societies and associations desirous of being registered and placed on the above list must make application to that effect, and forward to the Under Secretary for Agriculture and Stock the following particulars:—

Number of members who have paid their subscriptions for 1910.

Number of meetings held by the Society during 1910.

Date of the last meeting.

Name of the Secretary for 1911.

Departmental Announcements.

The EDITOR will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the EDITOR, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of SIXPENCE to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at ONE SHILLING each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, J. Mitchell; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, John Liverseed, Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Roma State Farm, manager, R. Soutter; State Farm, "Warren," Stanwell, manager, Thos. Jones; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

The Department has now prepared a booklet on "Flower Gardening for Amateurs," which may be obtained on application to the Under Secretary for Agriculture and Stock. Price, TWO SHILLINGS.

NOTICE OF SHOW DATES.

We wish to draw the attention of Secretaries of Agricultural and Pastoral Societies and Associations to the importance of promptly notifying the Editor of any change in the dates on which shows are to be held.

THE BOUNTIES ACT.

The Department of Agriculture and Stock have received from the Comptroller-General of Customs, Melbourne, a number of copies of "Memorandum for Information of Growers" and "Form of Notice of Intention to Claim Bounty" under the Commonwealth Bounties Act. Should any grower desire a copy of either the above, same will be supplied upon application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

"QUEENSLAND AGRICULTURAL JOURNAL."—GENERAL INDEX, VOLS. I. TO XXIV.

The GENERAL INDEX may be obtained on application to the Under Secretary, Department of Agriculture and Stock. Price: ONE SHILLING AND SIXPENCE.

DIRECTIONS FOR FORWARDING SPECIMENS (ENTOMOLOGY AND PLANT PATHOLOGY).

NOTE.—Experience has shown that the opportunity of seeking the advice of the Entomologist and Vegetable Pathologist has not been embraced, owing to the lack of information regarding proper procedure for the transmission of specimens; also, that satisfactory information has not been accorded when, although this has not been the case, either no specimens at all have accompanied the application or such only as on arrival have been found to be—by reason of their condition—unsuitable for examination. Under these circumstances, the following Directions are issued for public information:—

INSECTS.

If it be desired that the insects be received whilst still alive, some of the food-plant—not superficially wet, however—should be included in the box containing them, and, also, a little dry crushed paper, as an absorbent of moisture. Insects frequenting soil—or wood—should be sent in these matter, and generally insects injurious to articles derived from plants or animals or to manufactured products should be forwarded in samples of these articles or substances. Holes should not be made in the boxes used, unless quite exceptionally—when they should be limited to two or three, and be quite small.

Plants or portions of plants, including fruit, tubers, &c., that may illustrate insect injury, should be sent as directed for plants subject to disease proper. (See “Plant Diseases.”) Such specimens may be of great interest.

Generally speaking, insects should be forwarded in a dead condition, the killing having been effected by the “cyanide bottle,” tobacco fumes or anæsthetic, for fragile examples—moths, flies, &c., for instance; and by these agencies or by immersion in spirits of wine, formalin, hot water, &c., for hard-bodied ones—beetles, plant-bugs, grasshoppers, &c.—and for insects generally not suffering damage through being made wet, such as caterpillars or grubs. Dead examples of the latter kinds should be sent in spirits of wine diluted with water 1 part in 4, formalin diluted with water 1 part in 20, or in gin or other alcoholic beverage; the phial containing them, completely filled with its contents, being packed in a “mailing tube,” perforated wooden block, section of bamboo stem, or strong box.

Hard-bodied insects that have been immersed in spirits or formalin may be removed from these fluids, and sent, whilst still moist, packed amidst sawdust to which a few drops of carbolic acid or oil of turpentine have been added; or, if killed in other ways, be allowed to become perfectly dry and packed then in this medicated substance, great care being exercised in handling in the latter case. Small insects, when dry, should be packed in shredded tissue paper scattered amongst them or between layers of this; cotton wool should never be used in contact with them.

Butterflies and moths should be sent pinned (in impaling them they should be placed on their sides and the pin thrust through their thorax or mid-body) to cork, cork linoleum, or pith fastened to the inside of the box. The finer lace pins are suitable for this purpose. Or butterflies—and moths in some instances—may be enclosed in papers folded into triangular-shaped packets, of sizes to match the respective insects, these afterwards being packed into a box with crushed paper, to prevent movement, and powdered “moth ball” (Naphthalene) to repel ants.

In some instances (Scale Insects, &c.) it will be necessary to send food-plant (bark, stem, or leaf) and insect in association, each such specimen being simply wrapped in soft paper.

PLANT DISEASES.

PLANTS AND PORTIONS THEREOF.

These, if practicable, should be forwarded carefully packed so as to arrive in a condition approaching that exhibited when they were first procured. They should not be externally wet, however, or even damp—much less should their surfaces be moistened. If roots accompany the specimens, care should be taken

lest earth-particles therefrom soil the leaves or flowers; this may be secured by enclosing them in a paper or linen bag. Should circumstances not admit of their transmission in a fresh state, the specimens should be carefully dried between paper and under slight pressure only (not sufficient to quite flatten them out). They should be handled as little as possible either in gathering them, submitting them to this process, or in finally packing them. When being transmitted, they should be packed in soft paper between card or mill board. Any solid substance that will not quickly dry—roots or succulent stems, for example—and is liable to prompt decay, should be immersed in formalin 1 part in 20 water or in alcohol 1 part in 4 water prior to sending, and forwarded in this; or, after immersion for any period not less than 48 hours in one of these fluids, be taken out, wrapped in linen that has been moistened therewith, and enclosed in a tin box under conditions that will admit of moisture being conserved. In other cases—wood, fruit, tubers, &c.—the specimens may be forwarded securely packed in any ordinary manner.

GENERAL.

Specimens should be sent in fair number or amount, so as to afford the investigator full facilities for arriving at certain conclusions.

To identify insects and specimens generally with remarks submitted in writing relating to them, it is necessary that one example of each description in the packet, when this contains objects of more than one kind, be marked by having attached to it or otherwise associated with it a small label bearing a distinguishing number written in pencil. In the case of living specimens this should accompany each receptacle or packet devoted to the individuals of one kind.

When the names or other such facts of interest are sought, especially as aids in arranging collections of insects, &c., numbered duplicates should be sent, to be retained for reference or other purposes; it being understood that no return of specimens sent can be made generally, except by special arrangement.

POSTAL.

When specimens or the vessels containing them are liable to injury, either by concussion or pressure, whilst being transmitted, the package in which they are contained should be strong. Whilst fastened securely, this should not be done in such a way as to prevent inspection of its contents without its being broken. The address and stamp should be attached to a ticket distinct from the outside wrapper of the package, although this should bear the address repeated as well as the name of the sender. It should also be endorsed with a general statement of contents—*e.g.*, "Insects Only."

The charges for Packets by ordinary post are as follows:—1d. for 2 oz. or less, and 1d. for every additional 2 oz. or portion thereof. For those by Parcel Post—6d. for 1 lb. or less, and 3d. for every additional pound or portion thereof.

The address should be an official one, *e.g.*—

The Entomologist—Department of Agriculture and Stock, Brisbane.

And in every case a letter of advice should accompany each consignment.

Under special circumstances, the objects and materials necessary for the collection, preservation, and transmission of specimens may be provided.

DISEASES OF ANIMALS.—EXAMINATION OF SPECIMENS.

In accordance with an Order recently issued by the Minister for Agriculture, any persons deriving their principal means of livelihood from rural pursuits may have specimens, &c., examined by the Bacteriological Department free of charge. The Government Veterinary Surgeon, Mr. A. H. Cory, will at any time make examinations and report upon pathological specimens, &c., in connection with diseases of animals. When forwarding materials, full particulars of the case should be given. The specimens should where possible, be wrapped in a cloth saturated with disinfectant before placing in the receptacle, securely packed, and forwarded with the history thereof, carriage prepaid, as quickly as possible to the Department of Agriculture and Stock, Brisbane.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

—:O:—

Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sending an order.

BLACKLEG VACCINE.

DOUBLE VACCINE (powder form) for the PREVENTION of BLACK-LEG is now prepared by the Department of Agriculture and Stock, and may be obtained in Tubes containing not less than Ten Doses, at a cost of 3s. per Ten Double Doses.

Full Instructions for Use are sent with the Vaccine.

Applications for same must be accompanied by Remittance, and addressed to:—

THE GOVERNMENT BACTERIOLOGIST,

STOCK EXPERIMENT STATION,

YEERONGPILLY,

NEAR BRISBANE.

"THE QUEENSLAND FLORA"

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LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Paxter ...	2 Feb.	
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association ...	W. Jas. Sullivan ...		
Atherton ...	Atherton Agricultural, Pastoral, and Industrial Association	H. McKnight ...		
Atherton ...	Atherton and North Johnstone River District Farmers' Association	David Steel Imrie		
Atherton ...	Upper Barron and Malanda Farmers' Progress Association	A. G. Jones ...		
Ayr ...	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr ...	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Geo. S. Mackersie	18 and 19 May	
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	M. Selwyn Smith	15 Sept.	
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Gerald D. Savage	15 Sept.	8 Sept.
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Beenleigh ...	The Logan and Albert Canegrowers and Farmers' Association	Wm. Thorsborne ...		
Belli Creek, <i>via</i> Eumundi	Belli Creek Farmers' Progress Association	A. W. Richardson		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	21 and 22 July	6 and 7 July
Biggenden ...	Coalstown Lakes Farmers' Association	H. Radel ...		
Blackall ...	Barcoo Pastoral Society ...			
Blackbutt ...	Blackbutt Farmers' and Industrial Association	E. S. Innes ...		
Blenheim, <i>via</i> Laidley	Blenheim and District Farmers' Progress Association	W. A. Zerner ...		
Boonah ...	Fassifern Agricultural and Pastoral Association	H. R. Beverley ...	15 and 16 June	23 and 24 May
Booyal ...	Booyal Farmers' Progress Association	N. Rosenlund ...		
Bowen ...	Pastoral, Agricultural, and Mining Association	A. W. Kirke ...		
Bowen ...	Proserpine Farmers and Settlers' Association	J. Cooper ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowen ...	Bowen Farmers' Union ...	Thos. J. Mullan ..		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...		
Brisbane ...	Queensland Acclimatisation Society	Nicol Robinson ...		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, 11, 12, and 13 Aug.	7 to 12 Aug.
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Beekeepers' Association	George Butler ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Chamber of Agricultural Societies	C. A. Arvier ...		
Brisbane ...	Queensland Fruitgrowers' Industrial Trading Society	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ..		
Brisbane ...	Jersey Cattle Society of Queensland	Alfred Gorrie ...		
Brookfield ...	Brookfield, Pullen Vale, and Moggill Farmers' Association	F. B. Howard ...	20 July	23 and 24 May
Brooyar, <i>via</i> Gympie	Brooyar Farmers' Progress Association	E. J. Pike ...		
Buderim ...	Buderim Mountain Coffee and Fruitgrowers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Association ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	S. F. Luke ...	22, 23, and 24 Sept.	and 8 Sept.
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	M. W. Walker ...		
Bundaberg (Maudsleigh)	Burnett Heads Canegrowers and Farmers' Association	R. O. Strathdee ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Byrnestown...	Byrnestown Farmers and Dairy-men's Association	Geo. H. Bomford ...		
Burpengary...	Burpengary Farmers' Association ...	F. W. Uhlmann ...		
Caboolture ...	Caboolture Progress and Farmers' Association	F. W. Uhlmann ...		
Cairns ...	Aloomba Farmers' Association ...	Hugh A. Niven ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	A. H. Clarke ...	15 and 16 Sept.	21 and 22 Sept.
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cairns ...	Hambledon Planters' Association ...	A. W. Hawkins ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Cawdor ...	Highfields and Cawdor Farmers' Association	H. Franken ...		
Cedar Pocket, <i>vid</i> Gympie	Cedar Pocket Farmers' Progress Association	J. H. Jamieson ...		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell ...	...	29 and 30 May
Charters Towers	Charters Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	28 and 29 June	
Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Charters Towers	The Towers Horticultural Society ...	J. H. Chappel ...	...	
Childers ...	Isis Agricultural Association ...	H. Epps ...		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	R. S. Rankin ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps ...		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	John R. Wrench ...	26 and 27 May	22 and 23 June
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Chinchilla ...	Chinchilla Agricultural and Pastoral Association	F. E. Dare ...	6 April	5 April
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley ...		
Clermont ...	Peak Downs Dairymen and Settlers' Association	P. Noonan ...		
Cleveland ...	The Cleveland Horticultural, Agricultural, and Industrial Society	W. H. Ridley ...	...	15 July
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. C. Mott ...		
Columboola...	The Columboola Farmers and Settlers' Association	Geo. T. Sutton ...		
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooktown ...	Cook District Pastoral, Agricultural, Mining, and Industrial Association	E. A. S. Olive ...	...	21 and 22 June
Cooran ...	Cooran Progress and Agricultural Association	A. Booth ...		
Cooroy ...	Cooroy Progress and Farmers' Association	A. S. Douglas ...		
Cooyar ...	Yeraman Creek Farmers' Progress Association	M. Harland ...		
Coringa, <i>vid</i> Degilbo	North Darnil and Coringa Progress Association	John Leslie ...		
Coulson ...	Coulson Farmers' Progress Association	G. A. Lewald ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 and 27 July	11 and 12 July
Croydon ..	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh ...		
Cunnamulla	South Warrego Pastoral Association	J. Winward ...		
Dalby ...	Northern Downs Pastoral and Agricultural Association	Walter R. Hunter	...	10 and 11 May
Dallarnil Scrub, <i>vid</i> Degilbo	Dallarnil Farmers and Dairymen's Progress Association	H. J. Piper ...		
Degilbo ...	Degilbo District Farmers and Dairymen's Association	Thos. Brennan ...		
Degilbo ...	Emu Creek Farmers and Dairymen's Progress Association	Percy Harrison ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Didcot ...	Didcot Farmers and Settlers' Association	D. B. Hamilton ...		
Dugandan ...	Dugandan Farmers' Progress Association	John M. Court ...		
Dundowran, <i>via</i> Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk ...	Esk Pastoral, Agricultural, and Industrial Association	J. G. Smith ...	...	9 and 10 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Evergreen ...	Evergreen Farmers Progress Association	H. Rickert ...		
Flagstone Ck., <i>via</i> Helidon	Flagstone Creek Farmers' Progress Association	Geo. J. Deller ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	P. G. Woolley ...		
Fordsdale, <i>via</i> Grantham	The Fordsdale and Mount White-stone Farmers' Progress Association	W. M. Ridley ..		
Gayndah ...	Gayndah Pastoral, Industrial, Agricultural, and Horticultural Association	M. C. Stephenson	5 and 6 July	6 and 7 June
Gayndah ...	Reid's Creek Farmers' Progress Association	R. E. Wragge ...		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	W. Stevenson ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	Chas. M. Morris ...	2 June	1 June
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. F. W. Brown ...	24 and 25 May	23 and 24 May
Gooburrum, Bundaberg	Gooburrum Farmers and Cane-growers' Association	W. J. Tutin ...		
Goombungee	Goombungee Farmers' Association...	Thos. Smith ...	23 Feb.	
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	27 and 28 April	5 and 6 April
Goondoon ...	Goondoon Farmers' Association ...	H. English...		
Gooroolba ...	Gooroolba Farmers' and Settlers' Association	J. Richards ...		
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher...		
Grayson, <i>via</i> Warwick	Grayson Farmers' Progress Association	W. G. Skerman, junr.		
Gunalda ...	Gunalda Farmers' Progress Association	D. J. Caille ...		
Gympie ...	Agricultural, Mining, and Pastoral Association	F. Vaughan ...	14 and 15 Sept.	13 and 14 Sept.
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen ..		
Gympie ...	Gympie Horticultural Society	Charles Brasch ...		
Gympie ...	Woondum and Brisbane Road Farmers' Progress Association	J. Mullaly ...		
Gympie ...	Woondum and Mary River Farmers' and Progress Association	F. W. Johns ...		
Gympie ...	Combined Farmers' Association ...	W. Allen ...	3 and 4 June	
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Hatton Vale	Hatton Vale Farmers' Progress Association	W. H. Pimlott ...		
Headington Hill	Queensland Farmers' Association ...	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withecott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	...		
Herbert River	Halifax Planters' Club	A. Campbell ...		
Herbert River	Macknade Farmers' Association	Edwin S. Waller ...		
Herbert River	Fairford Farmers' Association	D. G. Scott ...		
Herbert River	United Farmers' Association	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Holway	28 Mar.	17 and 18 April

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Hodgson ...	Hodgson Farmers' Association ...	V. R. Speechley ...	13 and 14 June	
Hughenden ...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...		
Ideraway ...	Ideraway Farmers' Progress Association	L. Kirkley ...		
Ingham ...	Herbert River Pastoral and Agricultural Association	J. R. Mathewson ...	23 and 24 Sept.	8 and 9 Sept.
Ingham ...	Stone River Farmers' Association ...	W. B. G. Johnson		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	W. J. McGill ...		
Ipswich ...	Queensland Pastoral and Agricultural Society	G. W. Allen ...	27 and 29 April	26 and 28 April
Ipswich ...	The Amberley Farmers' Progress Association	Clark T. Seymour ...		
Ithaca ...	Ithaca Progress Association ...	Jas. Greenaway ...		
Kelsey Creek via Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kilcoy ...	Kilcoy Pastoral, Agricultural, and Progress Association	John Walsh ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	M. Bambling ...		
Killarney ...	Killarney Agricultural Society ...	...	9 and 10 Feb.	1 and 2 March
Kingaroy ...	Kingaroy Farmers' Association ...	C. H. Hooper ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	R. W. Whitehead	27 and 28 April	19 and 20 April
Kooroongarra	Kooroongarra Farmers' Progress Association	A. E. Markey ...	20 and 21 July	
Laidley ...	Lockyer Agricultural and Industrial Society (at Laidley)	W. A. McIlwraith	...	26 and 27 July
Lake Cootharaba	Lake Cootharaba Agricultural Progress Association	Reg. S. Johnston ...	2 and 3 May	
Lakeside ...	Mungore Farmers' Association ...	A. Reedman ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	11 and 12 May	10 and 11 May
Lowood ...	The Lowood and Tarampa Pastoral and Agricultural Association	J. E. Midgley ...	...	17 and 18 May
Ma Ma Creek, via Grantham	Ma Ma Creek Farmers' Progress Association	A. McKenzie ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black ...	14 and 15 June	
Mackay ...	Pioneer River Farmers and Graziers' Association	J. P. Moule ...	...	21 and 22 June
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...	24, 25, and 26 May	
Mareeba ...	Mareeba Mining, Pastoral, and Agricultural Association	F. Cruckshank ...		
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.	22, 23, and 24 June	
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	J. H. Jones ...	...	13, 14, and 15 June
Millmerran ...	Herries Farmers and Settlers' Association	A. Hawthorn ...		
Miriam Vale	Miriam Vale Farmers' Association ...	J. Spencer ...		
Mitchell ...	Maranoa Pastoral, Agricultural, and Industrial Association	Neil Hammond ...	...	23 and 24 May
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	Hy. Hopkins ...		
Mooloolah ...	The Mooloolah and Glenview Progress Association	A. H. Paget ...		
Mosman ...	Mosman Farmers' Association ...	R. D. Rex ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mourilyan ...	Mourilyan Canegrowers' Association	L. Copias ...		
Mullet Creek	Mullet and South Baffle Creek Farmers' Association	G. Lee ...		
Murray's Creek	Murray and Baffle Creek Progress and Farmers' Association	T. J. Gee ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—continued.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Nambour ...	Dulong and Kureelpa Farmers and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	Obi Obi Farmers and Dairymen's Progressive Association	H. Robinson ...		
Nambour ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	A. H. Bushnell ...	20 and 21 July	12 and 13 July
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. D. Hamilton ...	29 April	4 and 5 April
North Pine ...	The Pine Rivers Agricultural, Horticultural, and Industrial Association	A. D. Stewart ...	...	7 and 8 July
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. Cecil Colledge		
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
Oakey, <i>via</i> Eumundi	Kenilworth Farmers' Association	H. Hansen ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace ...		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	J. E. Stanton ...		
Palmwoods ...	Palmwoods Central Horticultural Progress Association	H. W. Major ...		
Peachester, <i>via</i> Beerwah, N.C. Line	The Peachester Progress Association	W. Vieritz ...		
Pelican ...	The Pelican Farmers and Settlers' Progress Association	H. K. Nevel ...		
Pickanjenie	The Pickanjenie Farmers' Progress Association	J. Bickerstaff ...		
Pie and Eel Creek	Pie and Eel Creek Farmers' Progress Association	David Webster, junr.		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	L. G. Sims ...	26 Jan.	25 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. J. Scott ...		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	H. McMahon ...		
Proserpine ...	Preston Farmers and Settlers' Association	W. B. Morgan ...		
Proserpine ...	Preston Farmers and Canegrowers' Association	R. C. Dagg ...		
Proserpine ...	Cannon Valley and District Farmers' Progress Association	W. A. Compton ...		
Proserpine ...	Proserpine Agricultural, Pastoral, and Industrial Association	...	...	26 Aug.
Queenton, <i>via</i> Charters Towers	Charters Towers Planters' Association	Jas. Frostick ...		
Roadvale ...	Roadvale Progress Association	Henry Clark ...		
Rockhampton	Alton Downs Farmers' Association	G. T. Crook ...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		
Rockhampton	Mount Etna Farmers and Selectors' Progress Association	G. Smith ...		
Rockhampton	Rockhampton Agricultural Society	H. Hill ...	9, 10, and 11 June	8, 9, and 10 June
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	...	16 and 17 May
Roma (Blythdale)	Warooby Farmers' Association	Geo. Munt ...		
Roma ...	Euthulla Farmers and Fruitgrowers' Association	J. Bates ...		
Roma ...	The United Maranoa Farmers' Association	R. Frederick, senr.		
Rosedale ...	The Rosedale and Tottenham Agricultural Society	F. Guérin ...		
Rosewood ...	Rosewood Farmers' Club	W. G. S. Blackmore	22 and 23 June	30 and 31 Aug.
Southport ...	Southport Horticultural Society	E. Fass ...	...	
Springure ...	Springure Pastoral and Agricultural Society	W. Fisher ...	19 and 20 May	18 and 19 May

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1910.	1911.
Stanthorpe ...	Border Agricultural, Horticultural, and Pastoral and Mining Society	Geo. Simcocks ...	10 and 11 Feb.	2 and 3 Feb
St. George ...	Balonne Pastoral and Agricultural Society	T. M. Cummings ...		
Sydney ...	Royal Agricultural Society of New South Wales	...	22 to 30 March	
Tabragalba ...	Tabragalba and Canungra Farmers' Progress Association	A R. Ludwig ...		
Takura (Pialba line)	Takura Farmers' Progress Association	W. J. Sorensen ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Thornton ...	Thornton Farmers' Progress Association	Geo. W. Drevesen		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Tingoora ...	Tingoora Farmers' Progress Association	T. E. Campbell ...		
Tolga ...	Rocky Creek District Farmers' Association	N. A. R. Pollock ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	19, 20, 21, 22 April	2, 3, and 4 May
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	24 and 25 May	27 and 28 June
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Wallumbilla	Wallumbilla Farmers' Association ...	A. Budd ...		
Warren ...	Woodend Farmers' Club ...	W. Lehfeldt ...		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15, 16, and 17 Feb.	15, 15, and 16 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	P. Hardgrave ...	23 July	
West Haldon, <i>via</i> Greenmount	West Haldon Farmers' Progress Association	C. J. Byron ...		
Wondai ...	Mondure Farmers' Progress Association	G. W. Roseby ...		
Wondai ...	Wondai Farmers' Progress Association	W. W. Finnimore ...	...	10 and 11 May
Wondai ...	Pastoral, Agricultural, and Industrial Society	C. B. Armstrong ...	...	10 and 11 May
Woolloom-gabba	Queensland Dairy Herdbook Society	Alfred Gorrie ...		
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Woombye ...	North Coast Agricultural and Horticultural Society	James McConachie ...	..	9 June
Wooroolin ...	Wooroolin Farmers' Progress Association	A. Deighton ...		
Wooroolin (Memerambi Siding)	Memerambi Farmers' Progress Association	J. E. Reid ...		
Yandina ...	Maroochy River Farmers' Union and Progress Association	W. R. Brayden ...		
Yerra (Mungai Junction)	Yerra District Farmers' Progress Association	H. W. Williamson		
Yingerbay ...	Yingerbay Farmers' Association ...	R. Frederich ...		
Zillmere ...	Zillmere Agricultural, Horticultural, and Industrial Society	Thos. Crompton ...	17 Sept.	16 Sept.

Societies and associations desirous of being registered and placed on the above list must make application to that effect, and forward to the Under Secretary for Agriculture and Stock the following particulars:—

Number of members who have paid their subscriptions for 1910.

Number of meetings held by the Society during 1910.

Date of the last meeting.

Name of the Secretary for 1911.

Departmental Announcements.

The EDITOR will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the EDITOR, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of SIXPENCE to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at ONE SHILLING each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, J. Mitchell; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, John Liverseed, Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Roma State Farm, manager, R. Soutter; State Farm, "Warren," Stanwell, manager, Thos. Jones; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

The Department has now prepared a booklet on "Flower Gardening for Amateurs," which may be obtained on application to the Under Secretary for Agriculture and Stock. Price, TWO SHILLINGS.

NOTICE OF SHOW DATES.

We wish to draw the attention of Secretaries of Agricultural and Pastoral Societies and Associations to the importance of promptly notifying the Editor of any change in the dates on which shows are to be held.

THE BOUNTIES ACT.

The Department of Agriculture and Stock have received from the Comptroller-General of Customs, Melbourne, a number of copies of "Memorandum for Information of Growers" and "Form of Notice of Intention to Claim Bounty" under the Commonwealth Bounties Act. Should any grower desire a copy of either the above, same will be supplied upon application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

"QUEENSLAND AGRICULTURAL JOURNAL."—GENERAL INDEX, VOLS. I. TO XXIV.

The GENERAL INDEX may be obtained on application to the Under Secretary, Department of Agriculture and Stock. Price: ONE SHILLING AND SIXPENCE.

DIRECTIONS FOR FORWARDING SPECIMENS

(ENTOMOLOGY AND PLANT PATHOLOGY).

NOTE.—Experience has shown that the opportunity of seeking the advice of the Entomologist and Vegetable Pathologist has not been embraced, owing to the lack of information regarding proper procedure for the transmission of specimens; also, that satisfactory information has not been accorded when, although this has not been the case, either no specimens at all have accompanied the application or such only as on arrival have been found to be—by reason of their condition—unsuitable for examination. Under these circumstances, the following Directions are issued for public information:—

INSECTS.

If it be desired that the insects be received whilst still alive, some of the food-plant—not superficially wet, however—should be included in the box containing them, and, also, a little dry crushed paper, as an absorbent of moisture. Insects frequenting soil—or wood—should be sent in these matter, and generally insects injurious to articles derived from plants or animals or to manufactured products should be forwarded in samples of these articles or substances. Holes should not be made in the boxes used, unless quite exceptionally—when they should be limited to two or three, and be quite small.

Plants or portions of plants, including fruit, tubers, &c., that may illustrate insect injury, should be sent as directed for plants subject to disease proper. (See “Plant Diseases.”) Such specimens may be of great interest.

Generally speaking, insects should be forwarded in a dead condition, the killing having been effected by the “cyanide bottle,” tobacco fumes or anæsthetic, for fragile examples—moths, flies, &c., for instance; and by these agencies or by immersion in spirits of wine, formalin, hot water, &c., for hard-bodied ones—beetles, plant-bugs, grasshoppers, &c.—and for insects generally not suffering damage through being made wet, such as caterpillars or grubs. Dead examples of the latter kinds should be sent in spirits of wine diluted with water 1 part in 4, formalin diluted with water 1 part in 20, or in gin or other alcoholic beverage; the phial containing them, completely filled with its contents, being packed in a “mailing tube,” perforated wooden block, section of bamboo stem, or strong box.

Hard-bodied insects that have been immersed in spirits or formalin may be removed from these fluids, and sent, whilst still moist, packed amidst sawdust to which a few drops of carbolic acid or oil of turpentine have been added; or, if killed in other ways, be allowed to become perfectly dry and packed then in this medicated substance, great care being exercised in handling in the latter case. Small insects, when dry, should be packed in shredded tissue paper scattered amongst them or between layers of this; cotton wool should never be used in contact with them.

Butterflies and moths should be sent pinned (in impaling them they should be placed on their sides and the pin thrust through their thorax or mid-body) to cork, cork linoleum, or pith fastened to the inside of the box. The finer lace pins are suitable for this purpose. Or butterflies—and moths in some instances—may be enclosed in papers folded into triangular-shaped packets, of sizes to match the respective insects, these afterwards being packed into a box with crushed paper, to prevent movement, and powdered “moth ball” (Naphthalene) to repel ants.

In some instances (Scale Insects, &c.) it will be necessary to send food plant (bark, stem, or leaf) and insect in association, each such specimen being singly wrapped in soft paper.

PLANT DISEASES.

PLANTS AND PORTIONS THEREOF.

These, if practicable, should be forwarded carefully packed so as to arrive in a condition approaching that exhibited when they were first procured. They should not be externally wet, however, or even damp—much less should their surfaces be moistened. If roots accompany the specimens, care should be taken

lest earth-particles therefrom soil the leaves or flowers; this may be secured by enclosing them in a paper or linen bag. Should circumstances not admit of their transmission in a fresh state, the specimens should be carefully dried between paper and under slight pressure only (not sufficient to quite flatten them out). They should be handled as little as possible either in gathering them, submitting them to this process, or in finally packing them. When being transmitted, they should be packed in soft paper between card or mill board. Any solid substance that will not quickly dry—roots or succulent stems, for example—and is liable to prompt decay, should be immersed in formalin 1 part in 20 water or in alcohol 1 part in 4 water prior to sending, and forwarded in this; or, after immersion for any period not less than 48 hours in one of these fluids, be taken out, wrapped in linen that has been moistened therewith, and enclosed in a tin box under conditions that will admit of moisture being conserved. In other cases—wood, fruit, tubers, &c.—the specimens may be forwarded securely packed in any ordinary manner.

GENERAL.

Specimens should be sent in fair number or amount, so as to afford the investigator full facilities for arriving at certain conclusions.

To identify insects and specimens generally with remarks submitted in writing relating to them, it is necessary that one example of each description in the packet, when this contains objects of more than one kind, be marked by having attached to it or otherwise associated with it a small label bearing a distinguishing number written in pencil. In the case of living specimens this should accompany each receptacle or packet devoted to the individuals of one kind.

When the names or other such facts of interest are sought, especially as aids in arranging collections of insects, &c., numbered duplicates should be sent, to be retained for reference or other purposes; it being understood that no return of specimens sent can be made generally, except by special arrangement.

POSTAL.

When specimens or the vessels containing them are liable to injury, either by concussion or pressure, whilst being transmitted, the package in which they are contained should be strong. Whilst fastened securely, this should not be done in such a way as to prevent inspection of its contents without its being broken. The address and stamp should be attached to a ticket distinct from the outside wrapper of the package, although this should bear the address repeated as well as the name of the sender. It should also be endorsed with a general statement of contents—*e.g.*, "Insects Only."

The charges for Packets by ordinary post are as follows:—1d. for 2 oz. or less, and 1d. for every additional 2 oz. or portion thereof. For those by Parcel Post—6d. for 1 lb. or less, and 3d. for every additional pound or portion thereof.

The address should be an official one, *e.g.*—

The Entomologist—Department of Agriculture and Stock, Brisbane.

And in every case a letter of advice should accompany each consignment.

Under special circumstances, the objects and materials necessary for the collection, preservation, and transmission of specimens may be provided.

DISEASES OF ANIMALS.—EXAMINATION OF SPECIMENS.

In accordance with an Order recently issued by the Minister for Agriculture, any persons deriving their principal means of livelihood from rural pursuits may have specimens, &c., examined by the Bacteriological Department free of charge. The Government Veterinary Surgeon, Mr. A. H. Cory, will at any time make examinations and report upon pathological specimens, &c., in connection with diseases of animals. When forwarding material, full particulars of the case should be given. The specimens should where possible, be wrapped in a cloth saturated with disinfectant before placing in the receptacle, securely packed, and forwarded with the history thereof, carriage prepaid, as quickly as possible to the Department of Agriculture and Stock, Brisbane.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

—:O:—

Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sending an order.

BLACKLEG VACCINE.

DOUBLE VACCINE (powder form) for the PREVENTION of BLACK-LEG is now prepared by the Department of Agriculture and Stock, and may be obtained in Tubes containing not less than Ten Doses, at a cost of 3s. per Ten Double Doses.

Full Instructions for Use are sent with the Vaccine.

Applications for same must be accompanied by Remittance, and addressed to:—

THE GOVERNMENT BACTERIOLOGIST,

STOCK EXPERIMENT STATION,

YEERONGPILLY,

NEAR BRISBANE.

“THE QUEENSLAND FLORA”

BY F. MANSON BAILEY, F.L.S.,

Colonial Botanist of Queensland.

WITH PLATES ILLUSTRATING SOME RARE SPECIES.

IN SIX PARTS, OF BETWEEN 300 AND 400 PAGES EACH, ROYAL OCTAVO.

Price, £1 10s. for Complete Work.

Obtainable at the DEPARTMENT of AGRICULTURE and STOCK.

QUEENSLAND AGRICULTURAL COLLEGE.

FOR SALE.

PURE-BRED PIGS, all from imported stock, including Berkshire and Middle Yorkshires. £1 1s. each for Sows; £2 2s. each for BOARS.

LARGE BLACK PIGS, £2 2s. each for Sows; £3 3s. each for BOARS.

Poultry of the following breeds:—Brown Leghorns, Silver-grey Dorkings, Old English Spangled Game, Indian Game, Plymouth Rocks, White Wyandottes, Silver-laced Wyandottes, Black Orpingtons, Buff Orpingtons, White Leghorns. Prices, from 10s. each, f.o.b. Gatton.

Eggs of the above breeds are available in the season—1st July to 30th November; and nine out of each setting are guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced if returned carriage paid. This rule will be strictly adhered to. Price, 10s. per setting, for all breeds, f.o.b. Gatton.

Applications for Setting of Eggs, accompanied by Remittance, may be made to the Principal, Queensland Agricultural College.

A few Settings of American Bronze-wing Turkey Eggs will be available at 15s. per setting, f.o.b. Gatton.

In cases where eggs are forwarded per parcel post, sixteen will be sent to the setting, and no responsibility will be taken in connection with the replacing of any eggs that fail to hatch.

As it has been decided that all surplus stock is to be disposed of by auction sales to be held annually, no pure-bred bulls will be available for private sale.

The following Stud Animals are available for Service at the College Farm, at a charge of 10s. for pure-bred and 5s. for grade cows:—Imported Shorthorn, Jersey, Holstein, and Guernsey Bulls.

The following Bulls imported from Great Britain are also available for Service at a charge of 10s. for all cows:—

Ayrshire Bull, SPECULATION.

Shorthorn Bull, BURTON SPOT.

Jersey Bull, LAST EDITION.

Sows may be served also by imported Berkshire, British Large Black, and Yorkshire Pigs, at a charge of 5s. for each service.

Paspalum Roots will be supplied to purchasers at 2s. 6d. per sack, f.o.b. Gatton. Applicants will be supplied on receipt of remittance to the amount of the order.

Small quantities of Roots of the following Grasses will also be available for disposal:—Rhodes Grass, Wonder Grass.

Seeds for Sale:—Cowpea, Sorghums, Panicum, Sunflower (15 bushels), Prairie Grass (15 bushels).

JOHN MAHON, Principal.

H. C. QUODLING, Acting Principal.

STATE FARM, BUNGEWORGORA I.

SEEDS AVAILABLE FOR DISPOSAL.

SORGHUM.—Planters' Friend ... 2d. per lb.

NOTE that Bags contain 3 bushels.

STATE FARM, WESTBROOK.

CANARY GRASS

(*Phalaris commutata*).

This is one of the best all-the-year-round grasses as yet introduced for Green Cutting, Hay, or Feeding-off. Planting should be done during the Winter and Early Spring, before hot dry weather sets in. It is particularly luxuriant in winter, and behaves remarkably well during the hot dry months. The Manager believes it will flourish in any part of the Commonwealth.

Robust Stools, equivalent to about 50 roots, TWO SHILLINGS each; 3 stools for FIVE SHILLINGS, f.o.b.; larger numbers of stools at cheaper rates.

CANARY GRASS SEED.

A limited quantity is now for sale.

To expedite delivery, application should be made direct to the MANAGER, Westbrook State Farm, together with remittance to cover the cost of Rootlets or Seed, and Freight on Rootlets.

STATE SCHOOLS will be supplied with Small Parcels of Rootlings of the above FREE OF CHARGE.

Applications, however, must include cost of freight.

SILVER NUGGET PUMPKIN SEED.

POULTRY.

GOLDEN WYANDOTTES, COCKERELS, AND HENS.

GOLDEN WYANDOTTE COCKERELS, from Heavy Laying Strains, FOR SALE. Price: SEVEN SHILLINGS AND SIXPENCE each.

TURKEYS.—Californian Bronze-Wing: Gobblers, 20s.; Hens, 12s. 6d.

AMERICAN BRONZEWING TURKEY GOBBLER AND HENS.

Apply to THE MANAGER.

STATE NURSERY, KAMERUNGA, CAIRNS.

RUBBER, COCOA, KOLA-NUT, CAROB BEAN, KAPOCK, VANILLA, CARDAMOM, BREADFRUIT, DIVI-DIVI, GINGER, AND OTHER VALUABLE TROPICAL ECONOMIC PLANTS FOR SALE, AT NOMINAL RATES, TO SETTLERS AND FARMERS.

The Instructor in Tropical Agriculture notifies that PLANTS or SEEDS of the above useful and valuable AUXILIARY PRODUCTS may be obtained by application to the Manager, Kamerunga State Nursery. PLANTS available at any time. SEEDS when in season, BEING MOSTLY OF SHORT VITALITY, should be promptly applied for.

KAPOCK, CARDAMOM, and especially rare Plants, or Seedlings difficult to raise, 1s. each, or 10s. per dozen; others, 6d. each, or 5s. per dozen. Seed, 6d. per packet. Plus packing, railage, or postage.

PARA RUBBER PLANTS.—Hardy, healthy young Parà Rubber Plants 3d. each, or 25s. per 100, f.o.b. Cairns, plus packing and railage.

Remittances should accompany applications.

Lists of Tropical Economic Plants available may be obtained on application to the Manager, Kamerunga State Nursery, Cairns, North Queensland.

RUBBER SEEDS AND PLANTS.

Variety and Name.	Plants or Seed.	When Available.	Price.
Rambong or Assam (<i>Ficus elastica</i>)	Plants only	Any time ...	1s. each, 10s. per doz.
Para Rubber (<i>Hevea braziliensis</i>) }	Plants ...	„ „ ...	3d. each
„ „ „ „ } *	Seed ...	Feb. to April	1s. per oz. (about 1 doz.)
Central American (<i>Castilloa elastica</i>)	Plants ...	Any time ...	6d. each, 5s. per doz.
„ „ „ „ „	Seed ...	Nov. to Jan.	1s. per oz. (about 100)
Iré or Logos Rubber (<i>Funtumia elastica</i>)	Plants only	Any time ...	1s. each, 12s. per doz.
Ceara Rubber (<i>Manihot Glaziovii</i>)	Seed only	„ „ ...	1s. per oz. (about 50)
West African Rubber (<i>Taberncemontana</i>)	Plants ...	„ „ ...	6d. each, 5s. per doz.
„ „ „ (Crassa)	Seed ...	„ „ ...	1s. per oz. (about 150)

Above prices are for delivery on the Nursery. If applicants wish Plants or Seed sent, packing, postages, railage to port, &c., are extra. Seed and small quantities of Plants may be sent by parcels post at purchaser's risk. Plants, being delicate, do not travel well by post.

Hessian-covered cases, holding one to three dozen, cost 4s. 6d. extra f.o.b. Cairns, whence they will be shipped "freight on." The demand for Seed being large and the supply limited, Orders received, with remittance, will be booked and completed as soon as Seed is available.

* Owing to the limited supply of plants and seed available at the Nursery, settlers requiring large numbers may, by special arrangement of the Department, import in quantity from Singapore or elsewhere. See conditions attached.

CONDITIONS UNDER WHICH RUBBER SEEDS OR PLANTS MAY BE
IMPORTED INTO QUEENSLAND FROM SINGAPORE.

1. The Department of Agriculture and Stock, Brisbane, to be notified of intending importations.
2. The importer to give an undertaking that the seeds or plants shall, for at least three months after arrival in Queensland, remain in a place approved by the Department of Agriculture and Stock and be subject to such treatment as the Department may require.
3. No imported rubber seeds or plants are to be placed within one mile of a coffee-tree during the time of quarantine.
4. Seeds or plants imported from Singapore are to be accompanied by a certificate to the effect that they have been packed under the supervision of the Director of the Botanic Gardens, Singapore, and are quite free from disease.

Department of Agriculture and Stock,
Brisbane, 6th August, 1907.

STATE FARM, WARREN.

SEED AND STOCK FOR SALE.

MAIZE.—Pride of the North, Hawkesbury Champion, Sydney Red, Boone County White, Silver Mine.

CEREALS.—Cretan Wheat, Canary Seed, Small quantities of Skinless and Cape Barley.

Pumpkin Seed.—Gramma, Crown, Ironbark, Large Button, and Mixed Cattle Varieties.

STOCK.—4 Pure Ayrshire Bull Calves, from £6 6s. to £10 10s. each.

PUREBRED AYRSHIRE BULL CALVES.

From Imported Stock. Prices, from £6 6s. to £10 10s., f.o.b. Warren.

PUREBRED BERKSHIRE BOARS AND SOWS.

Prices: Boars, £2 2s.; Sows, £1 1s., f.o.b. Warren.

FOR SERVICE—

Champion Draught Stallion of Central Queensland—

KING EDWARD VII. (Imported).

A limited number of Mares will be taken at £2 2s. each.

Prize Ayrshire Bull—

PIUS OF GREYSTANES.

Fee, Five Shillings per Cow. Agistment, 6d. per week.

Champion Boar of Central Queensland—

PRINCE RUFUS.

Fee, Five Shillings per Sow.

Arrangements can be made with the Manager for taking delivery and trucking of Stock sent to the Farm.

THOS. JONES, Manager.

QUEENSLAND AGRICULTURAL COLLEGE.

The College, which is situated within 4 miles of Gatton and 1 mile from the College Railway Siding, comprises 1,692 acres, and the buildings can accommodate 60 Students.

TERMS.

TWENTY-SEVEN POUNDS per annum, paid half-yearly in advance. Students are also charged One Pound per annum each for medical attendance, the sports fund, and for guarantee fee.

The course of instruction includes PRACTICAL AGRICULTURE in all its branches, DAIRYING, GARDENING, STOCK-BREEDING, and MECHANICAL ARTS. Classes are also held daily for THEORETICAL INSTRUCTION in these branches, as well as in SURVEYING, CHEMISTRY, &c.

The College Calendar, giving full particulars, may be obtained on application to the Principal at the College, or to the Under Secretary for Agriculture and Stock, Brisbane.

BURSARIES.

Four bursaries are given annually. An examination for these is held in December of each year. Bursaries will be awarded upon the following conditions:—Candidates (males) to be from fourteen to eighteen years of age, of sound constitution, and in good health; they must have resided in the State for the two years immediately preceding the time of their examination for such bursary, or their parents must have resided in the State three years immediately preceding such examination. The bursar is entitled—subject to good behaviour and the pleasure of Parliament—to free board and instruction as a resident student for a period of three years. He is required to take up his residence at the College within one month of the publication of the results of the examination; otherwise he forfeits his right to a bursary.

The AGE of CANDIDATES for Admission to the College as Students is Fourteen Years.

STATE FARM, BIGGENDEN.

FOR SALE.

MILKING SHORTHORN BULL CALF,

Out of "BILLAMBIL," Dark Red, 6 months old. Price, £5.

BULL CALF, MILKING SHORTHORN,

Out of "HANDSOME," Red and White, 9 weeks old. Price, £2.

4 CULL COWS, not in calf, in good store condition, £2 10s. to £3 each.

HAIRY VETCH SEED and PORTUGUESE LENTILS for sale in small quantities to persons wishing to grow them for seed. Both these are recommended as Winter Legume.

HERMITAGE STATE FARM.

SEEDS FOR SALE.

Panicum Frumentaceum ... 12 bushels Japan Millet ... 12 bushels

MAIZE.

Legal Tender	...	...	} Quick maturing varieties.
Hogan's Yellow Dent	...	...	
Golden Superb	...	...	} Mid-season.
Hildreth Yellow Dent	...	...	

Price, 4s. per bushel.

PURE-BRED MIDDLE YORKSHIRE BOARS (Progeny of Imported Stock), £2 2s. each on rail at Hermitage.

FOR SERVICE—

Middle Yorkshire Boar, HOLYWELL CHUB (Imported).

Berkshire Boar, YOUNG BOOMERANG (Imported).

Apply to the UNDER SECRETARY, Department of Agriculture and Stock, Brisbane; or to THE MANAGER, State Farm, Hermitage, Warwick.

STATE FARM, GINDIE.

FOR SALE.

MAIZE—20 Bushels—Early Leaming, Red Hogan, Hickory King, and White Horsetooth.

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QUEENSLAND GOVERNMENT OFFICE,
Marble Hall, 409-410 Strand, London, W.C.

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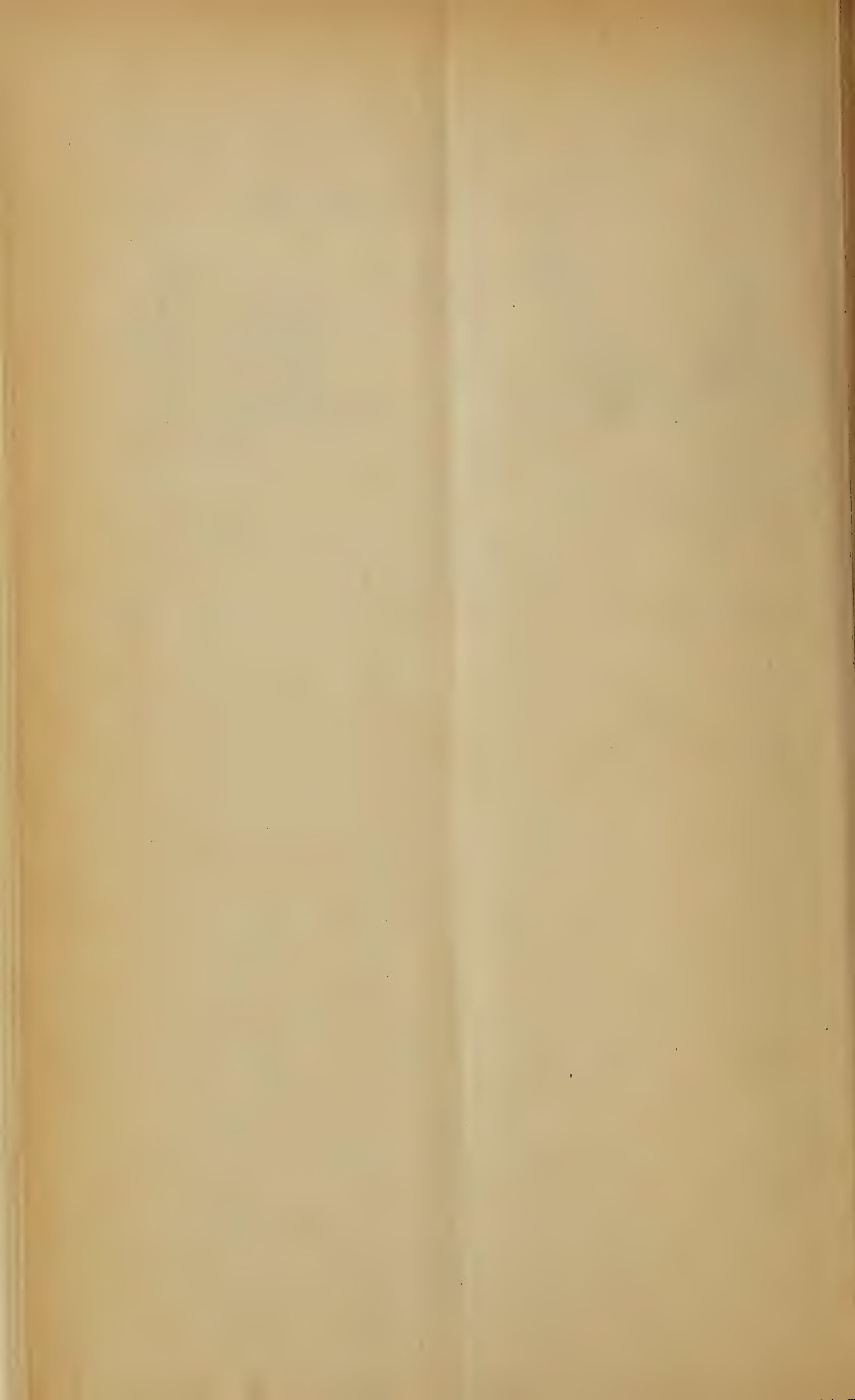


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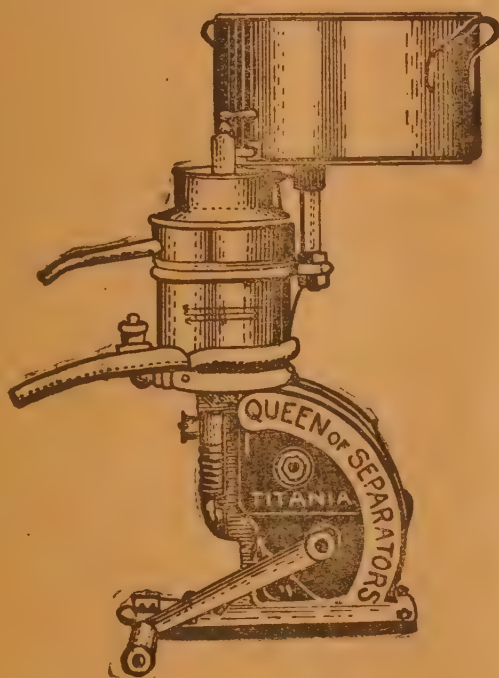
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THE STANDARD SEPARATORS have now been successfully worked in Queensland for the last 5 years. There are dozens of these Separators which have not cost 1/- for repairs during this time. The 1910 Model, as shown here, is far simpler to clean and easier to turn than other Separators, and, as we are prepared to give you a Separator on trial, and also to give you a 2 Years' Guarantee with the Separator and the working parts, it will give you a good chance to test and prove the Separator before you buy it. THE STANDARD is as clean a skimmer and as good a machine as any other make, and the price is a lot lower. There are only two wearing parts on the Standard, and these cost only a trifle to renew when worn, and we have dozens working for years without any renewals. If you really want a Separator that will do good work easily, let us send you a Standard on trial; then you can try the machine before paying a penny. This is a fair offer.

Lewis & Co., 6 Roma Street Markets, Brisbane.

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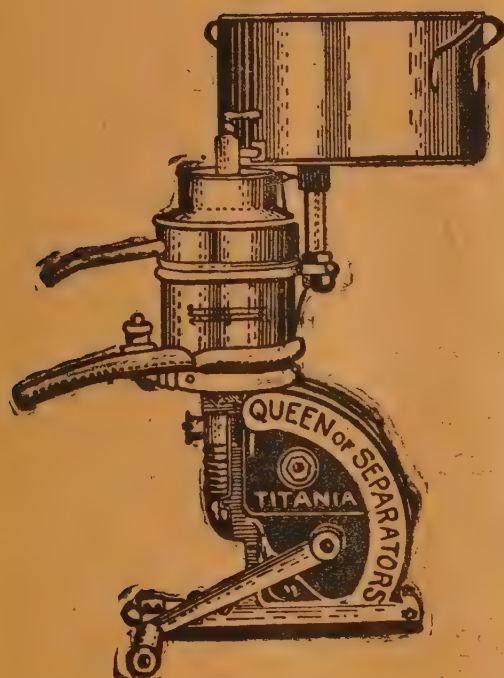
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Edited by

A. J. BOYD, F.R.G.S.Q.

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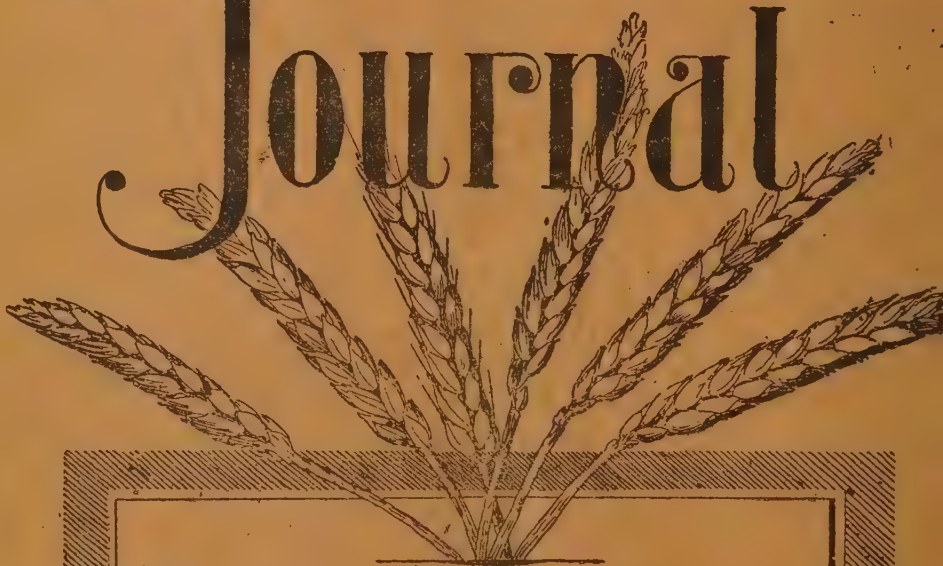
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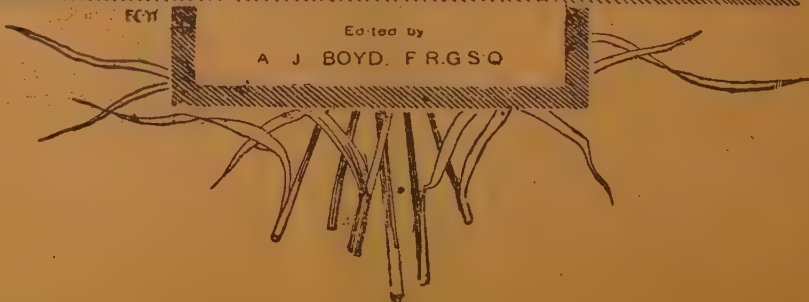
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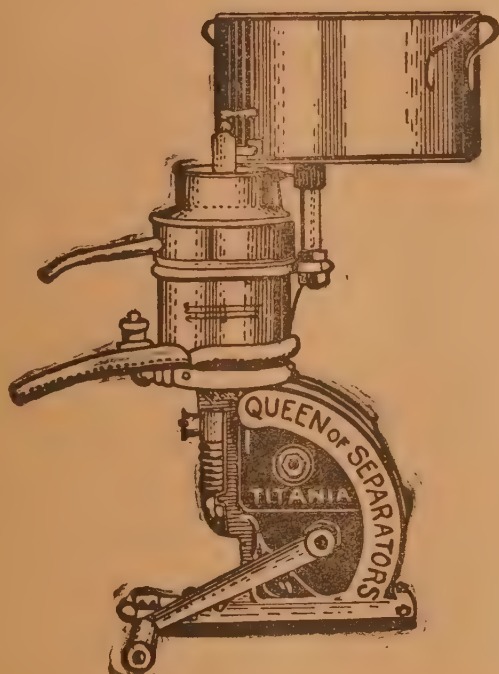
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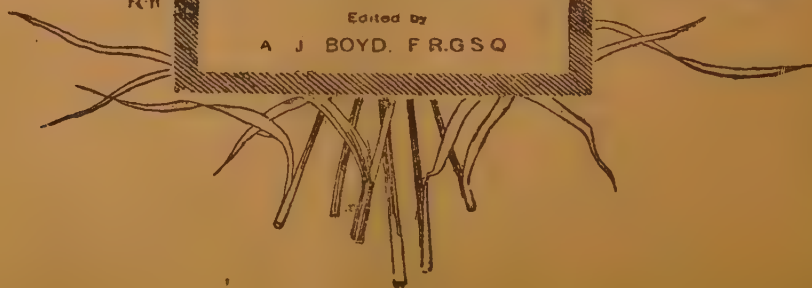
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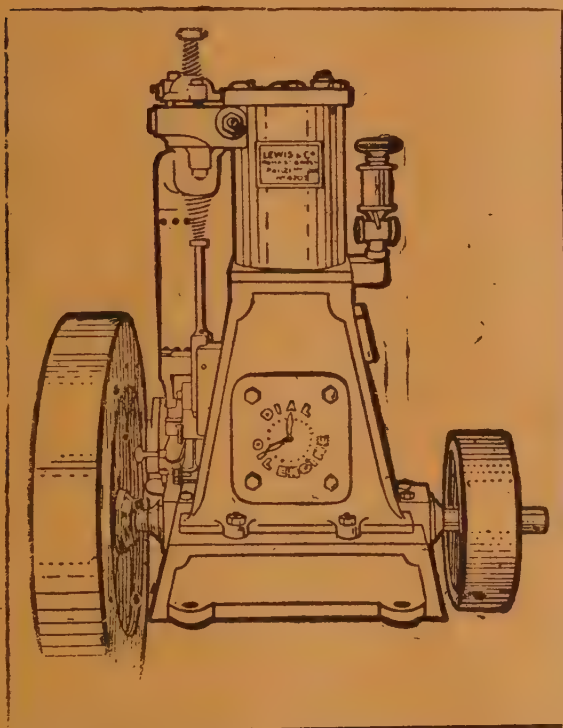
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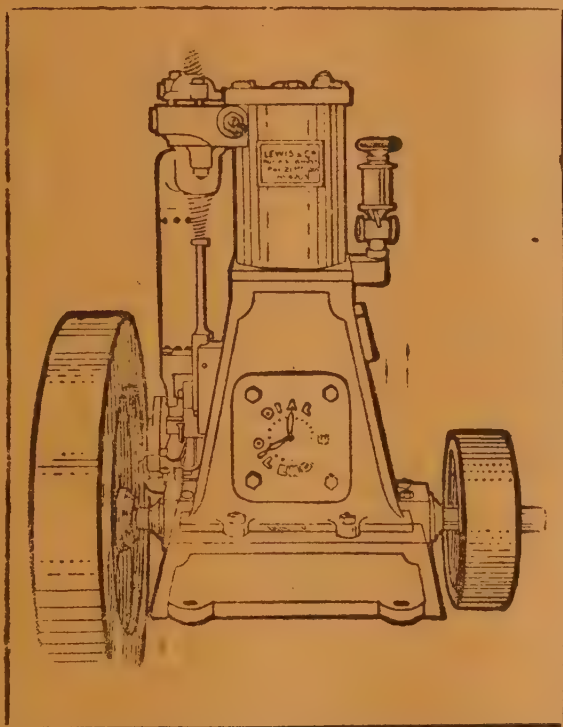
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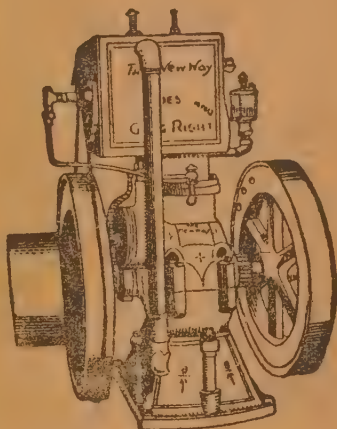
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